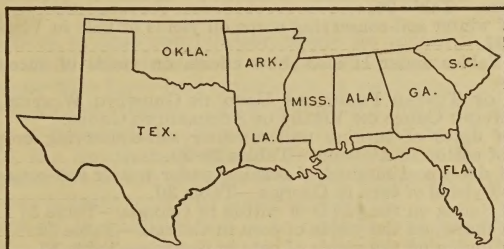


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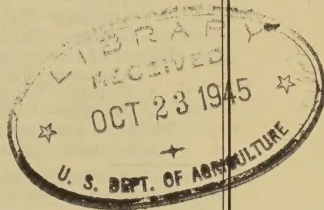
# EFFECTS OF WINTER SOIL-CONSERVING CROPS

A COMPILATION OF EXPERIMENTAL WORK ON WINTER  
SOIL-CONSERVING CROPS IN THE SOUTHERN  
REGION AND NEARBY STATES



Issued in the Interest of Agricultural Conservation by the Agricultural  
Adjustment Administration of the United States Department of  
Agriculture in Conjunction with the Cooperative Extension  
Service of the Department of Agriculture and the  
State Agricultural Colleges in the Southern Region

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<sup>1</sup> See table 45, in Southern Region Agricultural Conservation No. 1, for effects of both summer and winter legumes on yields of cotton, corn, and oats.



## INTRODUCTION

In this issue of Southern Region Agricultural Conservation it is intended to present concisely the results of experiments dealing with various problems that arise in connection with the growing of winter soil-conserving crops. The organization scheme of the compilation is grouped around three heads, namely, (1) effects of winter soil-conserving crops on yields of succeeding crops; (2) tested practices in relation to yields of succeeding crops; and (3) practices used in growing winter soil-conserving crops which affect the yields of the crop. The data included in the compilation could have been grouped around other heads. It is hoped that those who use the data will devise various ways of organization. Each user can adapt the data to fit his needs. Those who are interested in teaching procedure can consult *Establishing Winter Cover Crops in the Southern States*, a publication by the Division of Information of the Agricultural Adjustment Administration; Insert No. 3 of the Information File for Administrators, Teacher Trainers, and Teachers of Vocational Agriculture.

The authors of this compilation made no attempt to analyze the results or draw conclusions, for the compilation is intended for use by people who have had experience in analyzing and interpreting experiment-station results. As a whole, the material is inadequate; at least, it is believed that it will fail to satisfy needs of all types of farming in the Southern Region. It is, however, the best material available, and if used in conjunction with local experiences, it will be a partial but helpful guide to those who use it.

The scope of the publication is to include a digest of results of all experiments on winter soil-conserving crops published by the experiment stations within the Southern Region and nearby States from 1910 to the present time. However, results of four inoculation experiments are included which were published prior to 1910. Since these were the only available inoculation experiments that were applicable to the Southern Region, and since the need for inoculation is usually stressed, it was decided to include them.

These data on winter soil-conserving crops show briefly and concisely, under experimental conditions, the effects of the following: Inoculation, rates of planting, dates of planting, methods of planting, dates and methods of turning under, dates of harvesting, liming on yields, fertilizers on yields, and disposition of winter soil-conserving crops on succeeding crops. Some data are included that show seed and hay yields of various winter soil-conserving crops.

The chief soil-depleting crops that are used as a measure to determine the soil-improving effects of winter soil-conserving crops are cotton, corn, oats, sugarcane, wheat, peanuts, pecans, and kale.

The method used in preparation of this manuscript consisted of:

- (1) A list of the problems with which farmers in the southern region

are confronted and on which they need information, and on which published data could be found, was formulated. (2) The list of problems was forwarded to directors of experiment stations of the Southern Region and nearby States with the request that they supply, for purposes of this study, all available data from their stations on the problems listed, and that they make comments and suggestions regarding these problems. (3) A thorough search was made of all the experiment-station bulletins published and made available for this study from 1910 to date for material concerning the problems listed; the technical publications of the United States Department of Agriculture were also searched for pertinent data. (4) A digest was made of all information in each experiment applicable to the solution of any of the problems in the list. (5) The digests of results of experiments in each State were sent to the director of the experiment station concerned, for his corrections, comments, and approval. A form was developed and submitted to the experiment-station directors for their convenience in submitting additional data. This form carried spaces for recording specific data on the soil type, slope, and erosion; the lay-out of the plots, size, number of replications, etc.; spacings used; preparation of seed bed; the kind and amount of fertilizer used, as well as dates and methods of application; planting, and harvesting (or disposition) dates; varieties of the crops grown; yields of all crops; history of land use; and any other pertinent information that was available. (6) The corrections and additional data submitted by the various experiment stations were incorporated into a simplified digest which gives the following data concerning each experiment reported in this compilation: Conducted by, conducted at, period and dates, purpose, land history, soil, procedure and conditions, miscellaneous, and results. (7) Specialists in the United States Department of Agriculture reviewed these digests and made suggestions relative to the set-up that would most effectively present the data. The suggestions and modifications offered by specialists of the United States Department of Agriculture and experiment-station directors and agronomists were incorporated where feasible.

In no instance was material knowingly deleted or handled in such a way as to show bias or any preconceived idea. If data in any case seemed inconsistent, incomparable, or not clearly stated, care was taken either to mention the case in the body of the write-up or the unsettled points were satisfactorily answered through correspondence.

There are other special problems in the organization that might be of special value to some users. For instance, some of the tables that show the residual effects of winter soil-conserving crops are 2, 6, 7, 8, 25, and 29. The tables that show the effects of rotation are of special value. Tables 10 and 34 are cited as examples. Table 55 shows residual effects of fertilizer applied to cotton on vetch yields. Table 5 is an interesting example of the cumulative effects of green manure on the 4-year average yield of cotton. No attempt has been made to cite all of the problems that might be of special interest.

It is believed that this publication will prove helpful to county agents, vocational agricultural teachers, and other agricultural workers in carrying out their work and in furthering the purposes of the Agricultural Conservation Program.



# EFFECTS OF WINTER SOIL-CONSERVING CROPS

A COMPILATION OF EXPERIMENTAL WORK ON WINTER SOIL-CONSERVING CROPS IN THE SOUTHERN REGION AND NEARBY STATES

## I. WINTER SOIL-CONSERVING CROPS IN RELATION TO YIELDS OF SUCCEEDING CROPS

EFFECTS OF SPECIFIED WINTER SOIL-CONSERVING CROPS  
ON YIELDS OF COTTON IN—

### ALABAMA

#### EXPERIMENT A

**Conducted by:** Alabama Agricultural Experiment Station.

**Conducted at:** Auburn.

**Period:** 1896-1935.

**Purpose:** To determine the effect of legumes, turned under, on the yield of succeeding crops of cotton.

**Land history:** Not known.

**Soil:** "Off type" Cecil sandy loam. Slightly eroded.

**Procedure and conditions:** Plots, one-twentieth acre. One replication. Same land used continuously. Cotton was spaced 18 inches in 3½-foot rows. The land was flat-broken and bedded for cotton. Vetch was drilled, three rows, in cotton middles. Plot 6 was planted continuously to cotton with no legumes. On plots 3 and 8 cotton was planted each year and hairy vetch was drilled in the fall to be turned under the following spring for cotton. Plots 5 and 9 each carried a 2-year rotation of cotton and cowpeas, with hairy vetch planted in the cotton middles in the fall, from 1896-1923. Hairy vetch and cowpeas were plowed under for succeeding crops. From 1923-35 the cowpeas were cut for hay and followed in the fall by hairy vetch, which was turned the following spring for cotton.

Fertilizer was applied with a drill each spring to all the plots at the rate of 160 pounds of acid phosphate, 160 pounds of kainit per acre. In the fall of 1921, 400 pounds of acid phosphate were applied to half of each plot. This was repeated, on the same half of each plot, in the fall of 1922. The other half of each plot received 800 pounds of acid phosphate in the spring of 1923 to equalize the phosphate application. Four hundred pounds of acid phosphate per acre were applied to the whole of each plot in the fall of 1923 and each fall thereafter. Fertilizer was applied in the spring before cotton and immediately before planting vetch.

**Miscellaneous:** This experiment is part of what is known as the old rotation experiment.

**Results:** Given in table 1.

TABLE 1.—*Effect of legumes turned under on the yield of succeeding crops of cotton, three 10-year averages: 1896-1905; 1906-15; 1920-29; and a 6-year average, 1930-35; Auburn, Ala.*

Plot no.	Cropping system	3-year average yield of green matter from vetch <sup>1</sup>	Average yield of seed cotton per acre			
			10-year average, 1896-1905	10-year average, 1906-15 <sup>2</sup>	10-year average, 1920-29 <sup>3</sup>	6-year average, 1930-35
			Pounds	Pounds	Pounds	Pounds
6	Cotton continuously, no legumes-----	-----	803	573	349	555
3, 8	Cotton and vetch continuously, vetch as cover crop-----	9, 570	813	678	756	1, 229
5, 9	Cotton and vetch; cowpeas <sup>4</sup> -----	10, 904	890	958	1, 041	1, 211

<sup>1</sup> Yields of 1926, 1927, and 1929.

<sup>2</sup> Records from 1916-19 not available.

<sup>3</sup> Due to drought, cotton failed on all plots in 1925; 10-year average of 9 crops.

<sup>4</sup> In 1923 and succeeding years, cowpeas were cut for hay and followed by vetch. Thus, only a part of the yields in the third 10-year period gives effects from vetch. Cotton was alternated between plots 5 and 9; however, either plot 5 or 9 was in cotton each year of the test which gives a cotton yield for each year of the test.

<sup>5</sup> Only 9 crops.

Bailey, R. Y., Williamson, J. T., Duggar, J. F. Experiments with Legumes in Alabama. Ala. Agr. Expt. Sta. Bull. 232, 44 pp., illus. 1930. See pp. 4, 5, 6.

Crandall, W. G., Ayers, T. L., eds. Agricultural Education. Clemson Agr. Col., S. C., v. 4, nos. 11, 12, pp. 116-131. 1928. See p. 120.

Funchess, M. J., Dir. Ala. Agr. Expt. Sta., Auburn, Ala. Through correspondence of Mar. 31, 1936.

Tidmore, J. W., head, Dept. of Agron. and Soils, Ala. Poly. Inst., Auburn, Ala. Through correspondence of July 25, 1936, and Aug. 18, 1936.

## EXPERIMENT B

**Conducted by:** Alabama Agricultural Experiment Station.

**Conducted at:** Auburn.

**Period:** 1925-29.

**Purpose:** To determine the effects of vetch and annual melilotus, with and without lime, on the yield of cotton.

**Land history:** In cotton and corn 25 years or more. No record of cover crops having been on land.

**Soil:** Norfolk sandy loam. The degree of slope was 5 percent, and there was a slight degree of erosion.

**Procedure and conditions:** Plots were one-twentieth of an acre. Vetch and annual yellow melilotus were grown during the winter on plots cropped to cotton each year.

The land was turned, bedded, and planted to Cook's Wilt Resistant cotton on April 15, spaced 2 plants, 18 inches apart in the drill. Rows were 3½ feet wide.

On plot 3, which had no lime, annual yellow melilotus failed each year. Although the plants on this plot were inoculated and supplied with sufficient phosphorous and potash, none of them lived long enough to make a growth. Plots 5 and 6 received an application of 2 tons of ground limestone per acre every 5 years. Plots 8 and 9 received annual applications of 400 pounds of 16-percent basic slag (instead of superphosphate as the source of phosphorous), and an additional application of one-half ton of basic slag per acre every 5 years. Plot 3 received no lime.



**Miscellaneous:** Heavy rains occurred in late May and early June of 1928. In January 1928, vetch and annual melilotus were killed by frost. Residual effects of these crops grown in 1925, 1926, and 1927 were shown in the 1928 cotton crop, as the cover crops were winter-killed in 1928. The 1928 cotton yields are set apart in the table but are, however, included in the 5-year average.

The difference between cotton yields on limed vetch and melilotus plots may have been due to the fact that the stand of melilotus was reduced by freezing some years when vetch was not injured.

**Results:** The 1925-29 results of the experiment and the 1928 residual results are set forth in table 2.

**TABLE 2.**—*Effects of vetch and annual yellow melilotus with and without lime on the yield of cotton and the residual effect of 3 years of vetch and melilotus on the yield of cotton in 1928, Auburn, Ala., 1925-29*

Plot no.	Fertilizer treatment per acre <sup>1</sup>	Legume crop	Average <sup>2</sup> green weight yield per acre of specified legumes	5-year average yield of seed cotton per acre, 1925-29	Residual—Yield of cotton per acre, 1928
			Pounds	Pounds	Pounds
1, 4, 7, 10	400 superphosphate.....	None.....		260	103
2	50 muriate of potash.....				
3	400 superphosphate.....	Vetch.....	7, 418	728	204
5	50 muriate of potash.....				
6	400 superphosphate.....	Annual yellow melilotus <sup>3</sup> .....	0	237	-----
8	50 muriate of potash.....				
9	400 superphosphate.....	Vetch.....	8, 157	794	343
10	50 muriate of potash.....				
11	2 tons lime <sup>4</sup> .....	Annual yellow melilotus.....	5, 537	638	308
12	400 superphosphate.....				
13	50 muriate of potash.....	Vetch.....	8, 080	719	426
14	2 tons lime <sup>4</sup> .....				
15	400 basic slag.....	Annual yellow melilotus.....	2, 648	572	348
16	50 muriate of potash.....				
17	1½ ton basic slag <sup>5</sup> .....				

<sup>1</sup> Fertilizer given in pounds except as otherwise stated.

<sup>2</sup> Average of 3 crops of vetch and 2 crops of melilotus.

<sup>3</sup> Melilotus failed on this plot because of a lack of lime.

<sup>4</sup> Lime every 5 years.

<sup>5</sup> Applied at time of liming plots 5 and 6.

Bailey, R. Y., Williamson, J. T., Duggar, J. F. Experiments with Legumes in Alabama. Ala. Agr. Expt. Sta. Bull. 232, 44 pp. 1930. See pp. 18, 20, 24-26.

Tidmore, J. W., head, Dept. of Agron. and Soils, Ala. Poly. Inst., Auburn, Ala. Through correspondence of July 25, 1936.

## EXPERIMENT C

**Conducted by:** Alabama Agricultural Experiment Station.

**Conducted at:** Auburn.

**Period:** 1924-29.

**Purpose:** To compare stable manure, nitrate of soda, and winter legumes as sources of nitrogen for cotton and corn in a 2-year rotation. (See table 13 for corn yields.)

**Land history:** In cotton and corn 25 years or more. No record of cover crops having been on the land.

**Soil:** Norfolk sandy loam. The degree of slope was 5 percent.

**Procedure and conditions:** The land in the experiment was divided into two sections on which cotton and corn were alternated. Plots were one-twentieth acre. The same land was used continuously. Vetch was turned under about April 1.

The land was turned and bedded for cotton. About April 15 Cook's Wilt Resistant cotton was planted 18 inches in the row and two stalks to a hill.

Nitrate of soda was applied at the rate of 325 pounds per acre annually. Vetch plots received 1 ton of ground limestone per acre every 5 years. Fertilizers were applied in the furrows before planting or as a side dressing. Five tons of manure were broadcast on the manure plots before turning the land in the spring.

**Results:** Given in table 3.

TABLE 3.—*Effects of stable manure, nitrate of soda, and vetch on the yields of cotton, Auburn, Ala., 1925-29*

Plot no.	Fertilizer per acre <sup>1</sup>	5-year average yield of cotton per acre, 1925-29
		Pounds
1, 5	None.....	331
2	5 tons manure.....	1, 471
	400 superphosphate.....	
	325 nitrate of soda.....	
3	600 superphosphate.....	1, 222
	100 muriate of potash.....	
	Vetch.....	
2 4	600 superphosphate.....	1, 231
	100 muriate of potash.....	

<sup>1</sup> Given in pounds per acre except the manure, which is given in tons.

<sup>2</sup> Plot 4 received 1 ton of lime every 5 years and 400 pounds of superphosphate and 100 pounds of muriate of potash per acre in the fall when vetch was planted. It also received 200 pounds of superphosphate before cotton was planted in the spring. Monantha vetch was killed by cold in 1928.

Bailey, R. Y., Williamson, J. T., Dugger, J. F. Experiments with Legumes in Alabama. Ala. Agr. Expt. Sta. Bull. 232, 44 pp., illus. 1930. See pp. 9-12.

Tidmore, J. W., head, Dept. of Agron. and Soils, Ala. Poly. Inst., Auburn, Ala. Through correspondence of July 25, 1936.

## GEORGIA

### EXPERIMENT A

**Conducted by:** Georgia Coastal Plain Experiment Station, in cooperation with the United States Department of Agriculture.

**Conducted at:** Tifton.

**Period:** 1925-34.

**Purpose:** To determine the effect of turning under specified winter cover crops on the yields of succeeding crops of cotton and corn in a 2-year rotation. (See table 14 for corn yields.)

**Soil:** Tifton sandy loam.

**Procedure and conditions:** There were two sets of plots, one planted to cotton and the other to corn. Corn and cotton were rotated each year so that cotton followed corn and corn followed cotton. A winter cover crop was grown each year, the first seeding being in the fall of 1925. All legume seed was inoculated with commercial inoculating cultures. The first cotton and corn yields were secured in 1926.

The cover crops used were Austrian winter peas, monantha vetch, hairy vetch, and Abruzzi rye.



Petty's Toole cotton and Whatley's Prolific corn were used. Cotton was planted in rows 3.3 feet wide. Winter cover crops were planted from October 15 to 25 and turned under around March 1 for cotton.

Winter cover crops received no fertilizer.

Cotton received 1,000 pounds of 9-3-5 (phosphoric acid, ammonia, and potash) on the ammonia plots and the same amount of 9-0-5 on the plots which received no ammonia.

**Results:** Given in table 4.

TABLE 4.—*Effects of turning under green manure cover crops on the 9-year average yield of cotton, and the 9-year average green weight yield of the cover crops, Tifton, Ga., 1926-34*

Crop	9-year average yield per acre, 1926-34		
	Cover crops, green weight	Seed cotton	
		Without ammonia	With ammonia
	Pounds	Pounds	Pounds
None.....		748	991
Austrian winter peas.....	10,936	1,316	1,306
Monantha vetch.....	15,017	1,206	1,452
Hairy vetch.....	17,651	1,168	1,395
Abruzzi rye.....	5,308	1,041	1,278

<sup>1</sup> Seed in the 1930 plot proved to be smooth vetch.

<sup>2</sup> Seed in the 1932 plot proved to be Rosen rye instead of Abruzzi.

Ga. Coastal Plain Expt. Sta. Bull. 25 (Ann. Rept. 1934-35), 112 pp., illus. See pp. 36-38.  
 Stephens, J. L. Winter Legume Cover Crops \* \* \* Ga. Coastal Plain Expt. Sta. Bull. 23, 44 pp.,  
 illus. See pp. 31-35.  
 Stephens, J. L., agent, Bur. Plant Indus., U. S. Dept. Agr., Ga. Coastal Plain Expt. Sta., Tifton, Ga.  
 Through correspondence of July 22, 1936.

## EXPERIMENT B

**Conducted by:** Georgia Agricultural Experiment Station.

**Conducted at:** Experiment, Ga.

**Period:** 1927-34.

**Purpose:** To compare the effects of green manure and nitrate of soda on the yield of cotton.

**Procedure and conditions:** Austrian winter peas and hairy vetch were used for the green manure crop.

**Results:** Including an average of the yields for the last 4 years, which show whether or not cumulative effect was secured from the green manure, are given in table 5.

TABLE 5.—*Effects of green manure and of nitrate of soda on the yields of succeeding crops of cotton, Experiment, Ga., 1928-34*

Treatment	Nitrate of soda per acre	Yield of seed cotton per acre	
		7-year average, 1928-34	The last 4-year average, 1931-34
	Pounds	Pounds	Pounds
None.....	100	948	1,009
Do.....	200	1,137	1,208
Green manure.....	0	1,024	1,079
Do.....	100	1,127	1,210
Do.....	200	1,076	1,166

Ga. Agr. Expt. Sta. Ann. Rept. (1934-35), 52 pp., illus. See pp. 13, 14.

## LOUISIANA

### EXPERIMENT A

**Conducted by:** Louisiana Agricultural Experiment Station, Baton Rouge.

**Conducted at:** North Louisiana Experiment Station, Calhoun.

**Period:** 1930-35.

**Purpose:** To determine the immediate and residual effects of specified winter cover crops on the yield of cotton.

**Land history:** The land had been cropped to cotton for about 35 years. Cotton was fertilized with 300 pounds per acre of approximately 4-8-4. Home-mixed materials were used.

**Soil:** Ruston fine sandy loam.

**Procedure and conditions:** Plots were one twenty-fifth of an acre. There were four replications, and the same land was used continuously. Cotton was planted in 42-inch rows, and the spacing was about 12 inches. Cover crops were seeded as early as possible in the fall, usually about October 20. Vetch was drilled at the rate of 15 pounds per acre, Austrian winter peas at 25 pounds, oats at 10 pecks, and rye at 6 pecks per acre. Oats and rye were turned under on, approximately, March 20, and other cover crops usually about April 10.

Each plot was fertilized at the rate of 300 pounds of 16 percent superphosphate and 60 pounds of muriate of potash per acre. The first application of lime was in the fall of 1930, using 1½ tons per acre of finely pulverized lime rock. The second application was at the same rate in the fall of 1934, using a waste lime from the Brown Paper Mill, West Monroe, La.

Residual effects of cover crops were obtained in 1932, 1933, and 1934 by planting cotton continuously where cover crops had been grown during the winter of 1931-32. Because of dry weather during 1932, very little benefit was derived from the cover crops; the effects, however, showed up in the second (1933) cotton crop. Comparable yields show the first-year residual yields which were obtained in 1935 by planting cotton on another field where cover crops had been grown during the winters of 1932-33 and of 1933-34.

**Miscellaneous:** The average rainfall, in inches, from April to August in 1931, was 2.65; 1932, 1.85; 1933, 7.86; 1934, 2.74; and 1935, 3.42.

**Results:** Given in table 6.



TABLE 6.—*Effects of specified winter cover crops on the 5-year average yield of cotton and the residual effects for 3 years, Calhoun, La., 1931–35*

Winter cover crop	Immediate and residual effect of cover crops on seed cotton yields per acre				
	5-year average yield of cotton <sup>1</sup> per acre, 1931–35	Residual			
		1933 <sup>2</sup>	1934 <sup>3</sup>	1935 <sup>4</sup>	3-year average
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
None <sup>5</sup> .....	846	1,091	328	630	683
Oats.....	746	925	353	676	651
Rye.....	781	1,162	394	740	765
Hairy vetch.....	1,120	1,266	378	853	832
Austrian winter peas.....	1,099	1,469	419	955	948
Hairy vetch <sup>6</sup> .....	1,035	1,257	386	949	864
Austrian winter peas <sup>6</sup> .....	1,012	1,320	502	894	905
Hairy vetch (limed) <sup>7</sup> .....	1,132	1,307	407	787	834
Do. <sup>6</sup> .....	1,092	1,403	407	729	846
Austrian winter peas (limed) <sup>6</sup> .....	1,121	1,436	365	819	<sup>8</sup> 873

<sup>1</sup> Fertilizer applied either previous to planting cotton or at time of planting cover crop.<sup>2</sup> Second year residual effect.<sup>3</sup> Third year residual effect.<sup>4</sup> First year residual effect.<sup>5</sup> The check plot in the residual test was fertilized with 500 pounds of 0-9-5.<sup>6</sup> Fertilizer applied in the fall.<sup>7</sup> Superphosphate in the fall, muriate of potash in the spring.<sup>8</sup> Average given in letter was 877 pounds.

North La. Expt. Sta. Ann. Rept., 30 pp. 1931. See p. 9.

Summary Report of the North La. Expt. Sta., 24 pp. 1935. See p. 6.

Stewart, S., Supt., N. La. Agr. Expt. Sta., Calhoun, La. Through correspondence of Mar. 31 and Aug. 24, 1936.

## EXPERIMENT B

**Conducted by:** Louisiana Agricultural Experiment Station, Baton Rouge.

**Conducted at:** Northeast Louisiana Experiment Station, St. Joseph.

**Period:** 1929–35.

**Purpose:** To determine the immediate and residual effects of specified winter cover crops on the yield of cotton, and also to determine what winter legumes were adapted to the soil and climate of that locality.

**Land history:** The land had been in cultivation approximately 75 years, most of the time in cotton.

**Soil:** A very light, sandy loam type known as Sarpy sandy loam, and was of rather low fertility for alluvial soil.

**Procedure and conditions:** Plots were of six-row size. There were three replications, each of which had a check plot on which no cover crop was grown. The plan of the experiment was to grow cover crops for 3 years on the same plots, followed each spring by cotton, then withhold the cover crops 3 years and test the residual effects on the cotton. Thus, after having turned three crops, the cover crops were planted in a new series of plots, and the residual effects studied on the original plots.

For the first year's work the ground was broken flat in the fall of 1929 and the various cover crops sown broadcast. In the following years they were drilled in the cotton middles by hand just after first picking of the cotton, and covered with a Planet, Jr., one-mule

cultivator. Crops were turned under with a double disk. The seed were inoculated the first year only.

Cover crops were planted November 6, 1929, and turned under April 21, 1930. Cotton was planted May 6, 1930. In the following years cover crops were planted October 10 to 20, plowed under April 1 to 10, and cotton planted April 25 to May 10.

Rates per acre of seeding some crops were as follows: Hairy vetch, 14 pounds; monantha and Hungarian vetch, 18 pounds; winter peas, 24 pounds; bur clover, 50 pounds in bur in September; melilotus, 6 pounds; rye, 1 bushel.

In 1933 a test was made to determine the residual effects obtained from plowing under winter cover crops for the 3 years 1930-32. Cotton was grown in 1932 as usual, and in 1933 and 1934 it was grown without cover crops. Thus, in 1933 and 1934 yields were obtained for the second and third cotton crops, respectively, following winter cover crops.

No fertilizer was used on any of the plots except one plot without a cover crop, which annually received 150 pounds of Chilean nitrate of soda applied as a side dressing after cotton was chopped.

**Results:** Given in table 7.

TABLE 7.—*Immediate and residual effects of winter cover crops on the yield of cotton, St. Joseph, La., 1930-35*

Cover crops <sup>1</sup>	Yield of cotton per acre following cover crops						6-year average yield 1930-35 <sup>3</sup>	Residual effect of cover crops on yield of cotton per acre	
	1930	1931	1932	1933	1934 <sup>2</sup>	1935		Second year, 1933	Third year, 1934 <sup>2</sup>
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
None.....	1,045	1,144	990	1,306	961	781	1,038	1,128	516
150 pounds nitrate of soda.....	1,173	1,507	1,691	1,832	1,484	1,116	1,467	1,366	1,038
Austrian winter peas.....	1,553	1,804	2,011	2,162	2,002	1,372	1,817	<sup>4</sup> 1,323	855
Tangier peas.....				2,001	1,939	1,127	<sup>5</sup> 1,689		
Oregon hairy vetch.....	1,617	2,070	2,200	2,182	2,067	1,659	1,966	1,563	992
Oregon Hungarian vetch.....		2,148	2,562	2,261	2,073	1,339	<sup>6</sup> 2,077	1,612	968
Monantha vetch.....	1,129	2,551	2,472	2,107	1,953	1,674	1,981	1,531	879
Oregon smooth vetch.....	1,476	1,791	2,420	2,323	2,040	1,582	1,939		
Purple vetch.....				2,031	1,749	1,122	<sup>5</sup> 1,634		
Michigan hairy vetch.....				1,968	1,623		<sup>7</sup> 1,796		
Southern bur-clover.....	968	1,854	2,392	1,904	2,068	1,375	1,760	1,551	858
<i>Melilotus indica</i> .....	886	1,225	1,894		1,393	953	<sup>8</sup> 1,770	( <sup>9</sup> )	861
Red clover <sup>2</sup> .....	1,113	1,882	2,156				<sup>3</sup> 1,717	1,345	745
Crimson clover <sup>2</sup> .....	1,132	1,146	1,639				<sup>5</sup> 1,306	1,232	
Abruzzi rye <sup>2</sup> .....	655	974	1,003				<sup>5</sup> 877	953	491

<sup>1</sup> There were yields following a few more cover crops, but the data were not comparable.

<sup>2</sup> In 1934 cotton was planted late, May 20, and on June 16 it was injured by a severe tropical storm. Recovery on the check plots was slow and never complete. On plots having had cover crops, cotton recovered rapidly and produced a fair crop.

<sup>3</sup> Except as noted in footnotes 5, 6, and 7.

<sup>4</sup> Some cotton wilt appeared in 1 plot of Austrian winter peas.

<sup>5</sup> 3-year averages.

<sup>6</sup> 5-year average.

<sup>7</sup> 2-year average.

<sup>8</sup> *Melilotus* did not make sufficient growth to increase the yield of cotton.

<sup>9</sup> Red clover, crimson clover, and Abruzzi rye were dropped at the end of the 1932 crop, but the residual effects were tested.

Northeast La. Expt. Sta. (Bienn. Rept.), 16 pp. 1930-31. See p. 4.

Northeast La. Expt. Sta. (Summary Rept.), 16 pp. 1935. See pp. 5-7.

A Compilation of Experimental and Other Data on Winter Legumes. Miss. Agr. Expt. Sta. Bull. 303, 37 pp., illus. 1934. See p. 6.

Dowell, C. T., Dir., La. Agr. Expt. Sta., Baton Rouge. Through correspondence of May 16, 1936.

Haddon, C. B., Supt., Northeast La. Agr. Expt. Sta., St. Joseph. Through correspondence of Mar. 18 and Aug. 7, 1936.



## EXPERIMENT C

**Conducted by:** Louisiana Agricultural Experiment Station.

**Conducted at:** Baton Rouge.

**Period:** 1930-35.

**Purpose:** To determine the effects of specified winter cover crops on the yield of cotton.

**Soil:** Olivier silt loam. The degree of slope to the land varied from none to 2 percent, and there was very slight sheet erosion.

**Procedure and conditions:** Plots were approximately one-twenty-first of an acre in size, and there were four replications. The experiment was run continuously on the same land, each plot following itself each year.

The land was ridged or bedded, and Dixie Triumph cotton was planted every year in 3½-foot rows and spaced 10 inches in the drill. Cotton was planted about April 17 from 1931-33, and on April 3, 1934, and April 23, 1935. The average dates for two pickings were September 1 and October 1.

Cover crops were turned under and fertilizer "bedded on" 2 to 4 weeks before planting cotton. All plots received 600 pounds per acre of 0-8-5. The commercial nitrogen plot (600 pounds of 6-8-5) did not receive nitrogen in 1934 and 1935, the years in which no cover crops were turned under.

**Miscellaneous:** Cover-crop yields were calculated in pounds of green matter at turning under.

The low yield of rye and oats was probably because of the fact that they were planted only on the beds or ridges (the same as the other cover crops) and consequently occupied approximately only one-half of the surface of the plots.

**Results:** Given in table 8.

TABLE 8.—*Effects of specified winter cover crops on the 3-year average yield of cotton and the first- and second-year residual effects on cotton, Baton Rouge, La., 1931-35*

Cover crop	Immediate and residual effects of cover crops on yield of seed cotton per acre			
	Immediate 3-year average, 1931-33		Residual	
	Cover crop, green weight	Cotton	First year, 1934	Second year, 1935
	Tons	Pounds	Pounds	Pounds
None.....		1,152	1,033	1,409
Rye.....	0.6	1,227	1,002	1,454
Oats.....	1.4	1,228	1,080	1,432
<i>Melilotus indica</i> , limed.....	<sup>1</sup> 11.7	1,665	<sup>2</sup> 1,410	<sup>3</sup> 1,655
<i>Melilotus indica</i> .....	<sup>1</sup> 5.6	1,608	<sup>2</sup> 1,239	<sup>3</sup> 1,556
Austrian winter peas.....	7.1	1,785	1,270	1,631
Hairy vetch.....	9.8	1,769	1,341	1,643
None (6-8-5 fertilizer).....		1,607	<sup>4</sup> 1,119	<sup>4</sup> 1,578

<sup>1</sup> 2-year average, 1931 and 1932.

<sup>2</sup> Second-year residual effect. No *melilotus* in 1933.

<sup>3</sup> Third-year residual effect. No *melilotus* in 1933.

<sup>4</sup> No nitrogen applied in 1934 or 1935.

Dowell, C. T., Dir., Agr. Expt. Sta., Baton Rouge, La. Through correspondence of May 16, 1936.

Sturgis, M. B., Prof. of Agron., La. Agr. Expt. Sta. Through correspondence of July 30, 1936.

## MISSISSIPPI

## EXPERIMENT A

**Conducted by:** Mississippi Agricultural Experiment Station, State College.

**Conducted at:** Raymond Branch Experiment Station, Raymond.

**Period:** 1928-34.

**Purpose:** To determine the effect of specified winter legumes, turned under, on the yield of a succeeding crop of cotton.

**Land history:** Before the experiment was started, the land had been in cultivation for 60 years. The crops were cotton, velvetbeans, soybeans, oats, vetch, and bur-clover. The cover crops—oats, vetch, and bur-clover—had been used on the land a total of 9 years. Cotton was grown in 1925 producing an average of 300 pounds of seed cotton per acre. Velvetbeans were planted in the summer of 1926 and turned under. Soybeans were planted in the summer of 1927 and cut for hay. They were again grown in 1928 and turned under. Oats, vetch, and bur-clover were planted in the fall of 1925 and 1926 and turned under. Oats and vetch were planted in the fall of 1927 and cut for hay in the spring.

**Soil:** Olivier silt loam. There was about 1 percent slope to the land, and there was slight sheet erosion.

**Procedure and conditions:** Plots were one-twentieth of an acre in size and there were four replications. Each plot consisted of 5 rows 125 feet long, between each of which was a blank row. Rows were  $3\frac{1}{2}$  feet wide. Cotton was spaced two stalks to each foot. The experiment was run on the same land continuously.

The method of preparation of the seedbed was as follows: Middle breaker used, fertilized, tractor middle breaker used again, harrowed, and planted.

Cover crops were turned under on the following dates: April 1, 1929; April 15, 1930-34.

Cotton was planted on April 15, 1929; May 1, 1930; April 28, 1931; May 9, 1933; April 20, 1934. It was picked three to four times until bare.

Variety of cotton used was Lone Star 168 in the years 1929-31, and Lone Star 561 in the years 1932-34.

Fertilizer was applied annually to cotton at the rate of 600 pounds per acre of 0-8-4, or 48 pounds of phosphorus and 24 pounds of potash. Dates of application were April 15, 1929; April 30, 1930; April 27, 1931; May 9, 1933; and April 20, 1934. No fertilizer was applied in 1932. Fertilizer was applied by hand in the furrow. It was weighed separately for each row.

**Results:** Given in table 9.



TABLE 9.—*Effects of specified winter legumes turned under, on the yield of a succeeding crop of cotton, Raymond, Miss., 1929-34*

Cover crop	Yield of seed cotton per acre						
	1929	1930	1931	1932	1933	1934	6-year average
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
None.....	1,061	1,207	783	576	919	531	846
Hairy vetch.....	1,133	1,439	1,037	839	1,368	1,143	1,160
Monantha vetch.....	1,265	1,258	1,112	777	984	758	1,026
Bur-clover.....	965	1,165	1,110	816	955	570	930
Crimson clover.....	942	1,069	744	785	951	684	862
Austrian peas.....	1,021	1,027	863	854	930	860	926

Clark, C. F. A Compilation of Experimental Data on Cotton Fertilizers Applicable to the Hill Sections of Mississippi. Miss. Agr. Expt. Sta. Bull. 309, 49 pp. 1935. See p. 27.

Wallace, H. F., Cooley, J. L., Jr. Report of the Raymond Branch Experiment Station, 1929. Miss. Agr. Expt. Sta. Bull. 271, 38 pp., illus. See p. 15.

Perkins, W. R., vice director, Miss. Agr. Expt. Sta., State College. Through correspondence of Aug. 10, 1936.

## EXPERIMENT B

**Conducted by:** Mississippi Agricultural Experiment Station, State College.

**Conducted at:** Holly Springs Branch Experiment Station, Holly Springs.

**Period:** 1925-35.

**Purpose:** To determine the effect of a 2-year rotation including commercial fertilizer and vetch as a cover crop on the yield of cotton.

**Land history:** Two adjoining tracts of land, about six acres each, were built up to about the same fertility by 16 years of crop rotation, with legumes, which increased the organic and mineral content of the soil.

**Soil:** Memphis silt loam. There was 3 percent slope to the land and slight erosion. It was valley land.

**Procedure and conditions:** Each tract of land was about 6 acres. In 1925, a continuous cotton test was started on one tract. The other tract was divided into two 3-acre plots and continued in a rotation. There were 3 replications of the continuous cotton test, and 5 replications of the rotation test. The same land was used continuously throughout the experiment.

The continuous cotton test plot had no legumes after 1925. The variety of cotton used was Stoneville 2.

The rotation was as follows: First year, cotton followed by vetch which was allowed to mature and remain on the land; second year, vetch plowed under in time for corn (for grain) with soybeans, or sorghum for silage. (The corn and soybeans or sorghum were alternated.) Corn or silage was followed by a volunteer crop of vetch which in some years was cut for hay. This volunteer vetch, or vetch stubble, was plowed under in time for planting cotton. The cotton variety used was Cleveland 54.

Cotton rows were 40 inches wide, and cotton was spaced 2 to 5 stalks per foot.

Six hundred pounds per acre of 4-8-8 fertilizer (nitrogen, phosphoric acid, and potash) were applied in the list before seeding to cotton. On the continuous cotton land it was applied by hand, and on the rotation land it was applied with planter.

The average date of planting cotton was April 30, the latest date May 12, and the average date of harvesting was October 15; the latest November 1.

**Miscellaneous:** The continuous cotton test was part of a fertilizer experiment. The rotation test was part of a cotton variety experiment.

Damage by the cotton hopper prevented larger yields in the rotation test.

**Results:** Given in table 10.

TABLE 10.—*Effect of a 2-year rotation, including legumes, on the yield of cotton Holly Springs, Miss., 1925–35*

Cropping system	Yield of seed cotton per acre					
	1925	1926	1927	1928	1929	1930
Cotton, continuously.....	<i>Pounds</i> 1,996	<i>Pounds</i> 2,065	<i>Pounds</i> 1,238	<i>Pounds</i> 1,605	<i>Pounds</i> 1,814	<i>Pounds</i> 1,414
Cotton, in rotation.....	1,550	1,973	1,637	2,148	2,401	1,970

Cropping system	Yield of seed cotton per acre					
	1931	1932	1933	1934	1935	11-year average 1925–35
Cotton, continuously.....	<i>Pounds</i> 682	<i>Pounds</i> 1,305	<i>Pounds</i> 1,992	<i>Pounds</i> 1,712	<i>Pounds</i> 1,282	<i>Pounds</i> 1,555
Cotton, in rotation.....	1,061	1,932	1,700	1,557	1,496	1,766

McGehee, T. F., Casanova, O. B. Report of the Holly Springs Branch Experiment Station, 1930. Miss. Agr. Expt. Sta. Bull. 286, 19 pp., illus. See p. 13.

Casanova, O. B. Report of the Holly Springs Branch Experiment Station, 1931. Miss. Agr. Expt. Sta. Bull. 296, 12 pp., illus. See pp. 10, 11.

Ames, C. T., Assistant Director in charge, Holly Springs Branch Expt. Sta. Through correspondence of Aug. 10, 1936.

## SOUTH CAROLINA

### EXPERIMENT A

**Conducted by:** South Carolina Agricultural Experiment Station.

**Conducted at:** Clemson.

**Period:** 1930–35.

**Purpose:** To determine the effects of fresh manure as compared with a cover crop of rye and vetch on the yield of succeeding crops of cotton.

**Soil:** There was about 2 percent slope to the land and no erosion.

**Procedure and conditions:** The rye and vetch cover crops, both manured and unmanured, were turned under 10 days before planting cotton.

All the land used in the experiment received the same amount of commercial fertilizer.

Manure, when used, was applied at the rate of 8 tons per acre about 2 weeks before planting cotton.

**Results:** Given in table 11.

TABLE 11.—*Effects of a cover crop of rye and vetch as compared with fresh manure on the yield of succeeding crops of cotton, Clemson, S. C. [1930-35]*

Preceding crop	6-year <sup>1</sup> average yield of seed cotton per acre	
	Without manure	With manure
	Pounds	Pounds
No cover crop.....	1, 116	1, 530
Rye and vetch.....	1, 364	1, 850

<sup>1</sup> 1930-35. These dates were deduced.

Patrick, C. S. S. C. Agr. Expt. Sta. Ann. Rept. (1934-35) 162 pp. 1935. See pp. 72, 73.

## EXPERIMENT B

**Conducted by:** South Carolina Agricultural Experiment Station, Clemson.

**Conducted at:** Pee Dee Experiment Station, Florence.

**Period:** 1928-33.

**Purpose:** To determine the effects of various cover crops, with and without applications of sodium nitrate, on the yield of cotton.

**Land history:** Cotton had been grown on this soil since 1924, during which time there was an annual application of 750 pounds of 4-8-4 fertilizer.

**Soil:** Orangeburg very fine sandy loam; the land was level and there was no erosion.

**Procedure and conditions:** The cover crops were seeded early in September in the cotton middles with a five-disc grain drill. The rates of seeding for 1928 and 1929 were 40 and 55 pounds per acre respectively for the vetches and Austrian winter peas. In 1930 and 1931, the rates of seeding were 30 and 40 pounds per acre, respectively, for the vetches and Austrian winter peas. Yield data on the top growth of cover crops were usually obtained about March 20, after which the land was disked, plowed, and prepared for cotton.

All plots were fertilized uniformly before planting cotton. In 1929, the fertilizer application was 720 pounds of 3-9-3, and in 1930, 1931, and 1932 it was decreased to 540 pounds of 4-10-4 per acre. The cotton on half of each cover crop plot received a side dressing of 200 pounds of sodium nitrate per acre during the summer. The other halves were left without a side dressing.

**Results:** Given in table 12.

TABLE 12.—*Yield of cotton following various winter cover crops, and green and dry weight yields of the cover crops, Florence, S. C., 1929-33*

Preceding crop	5-year average cover crop yield, 1929-33 <sup>1</sup>		4-year average yield of seed cotton per acre, 1929-32	
	Green	Dry	Without sodium nitrate	With sodium nitrate
	Pounds	Pounds	Pounds	Pounds
None.....			1, 505	1, 654
Austrian winter peas.....	9, 209	1, 860	1, 604	1, 738
Monantha vetch.....	17, 198	2, 733	1, 735	1, 829
Hairy vetch.....	9, 928	2, 129	1, 778	1, 859
Hungarian vetch.....	8, 333	1, 787	1, 677	1, 790

<sup>1</sup> In 1932 inferior hairy vetch seed was used. Low yields resulted.

Hall, E. E., Albert, W. B., Watson, S. J. Winter Cover Crop Experiments at the Pee Dee Experiment Station, S. C. Agr. Expt. Sta. Circ. 51, 13 pp., illus. 1933. See pp. 5, 6, 12, 13.



EFFECTS OF SPECIFIED WINTER SOIL-CONSERVING CROPS ON  
YIELDS OF CORN IN—

## ALABAMA

**Conducted by:** Alabama Agricultural Experiment Station.**Conducted at:** Auburn.**Period:** 1924-29.**Purpose:** To compare stable manure, nitrate of soda, and winter legumes as sources of nitrogen for cotton and corn in a 2-year rotation. (See table 3 for cotton yields.)**Land history:** In cotton and corn 25 years or more. No record of cover crops having been on the land.**Soil:** Norfolk sandy loam. The degree of slope was 5 percent.**Procedure and conditions:** The land in the experiment was divided into two sections on which cotton and corn were alternated. Plots were one-twentieth of an acre. The same land was used continuously. Vetch was turned under about April 1.

For corn the land was turned. Four-foot rows were laid off, and corn planted in water furrows. About April 15 Whatley's or Indian Chief corn was planted 18 to 27 inches in the row and 1 stalk apart.

Nitrate of soda was applied at the rate of 325 pounds per acre annually. Vetch plots received 1 ton of ground limestone per acre every 5 years. Fertilizers were applied in the furrows before planting or as a side dressing. Five tons of manure were broadcast on the manure plots before turning the land in the spring.

**Results:** Given in table 13.TABLE 13.—*Effects of stable manure, nitrate of soda, and vetch on the yields of corn, Auburn, Ala., 1925-29*

Plot no.	Fertilizer per acre <sup>1</sup>	5-year average yield corn per acre 1925-29
6, 10	None.....	<i>Bushels</i> 7.9
7	5 tons manure.....	38.3
8	325 nitrate of soda.....	35.7
	200 superphosphate.....	
	100 muriate of potash.....	30.9
	Vetch.....	
9	400 superphosphate.....	30.9
	100 muriate of potash.....	

<sup>1</sup> Given in pounds per acre except the manure which is given in tons.<sup>2</sup> Plot 9 received 1 ton of lime every 5 years and 400 pounds of superphosphate and 100 pounds of muriate of potash per acre in the fall when vetch was planted. Monantha vetch was killed by cold in 1928. In 1929 rabbits damaged vetch so severely that only 809 pounds of green matter per acre were produced.

Bailey, R. Y., Williamson, J. T., Duggar, J. F. Experiments with Legumes in Alabama. Ala. Agr. Expt. Sta. Bull. 232, 44 pp., illus. 1930. See pp. 9-12.

Tidmore, J. W., head Dept. of Agron. and Soils, Ala. Poly. Inst., Auburn, Ala. Through correspondence of July 25, 1936.

## GEORGIA

**Conducted by:** Georgia Coastal Plain Experiment Station in cooperation with the United States Department of Agriculture.**Conducted at:** Tifton.**Period:** 1925-34.

**Purpose:** To determine the effect of turning under specified winter cover crops on the yields of succeeding crops of corn and cotton in a 2-year rotation. (See table 4 for cotton yields.)

**Soil:** Tifton sandy loam.

**Procedure and conditions:** There were two sets of plots; one planted to cotton and the other to corn. Corn and cotton were rotated each year so that cotton followed corn and corn followed cotton. The winter cover crop was grown each year, the first seeding being in the fall of 1925. The first cotton and corn yields were secured in 1926. All legume seed was inoculated with commercial inoculating cultures.

The cover crops used were Austrian winter peas, monantha vetch, hairy vetch, and Abruzzi rye.

Petty's Toole cotton and Whatley's Prolific corn were used. Corn was planted in rows 4 feet wide. Winter cover crops were planted from October 15 to 25 and turned under around March 15 for corn.

Winter cover crops received no fertilizer.

Corn received 500 pounds of 10-2-4 (phosphoric acid, ammonia, and potash) on the ammonia plots and the same amount of 10-0-4 on the plots which received no ammonia.

**Results:** Given in table 14.

TABLE 14.—*Effects of turning under green manure cover crops on the 9-year average yield of corn, and the 9-year average green weight yield of the cover crops, Tifton, Ga., 1926-34*

Crop	9-year average yield per acre, 1926-34		
	Cover crops, green weight	Corn	
		Without ammonia	With ammonia
	Pounds	Bushels	Bushels
None.....		34.9	37.3
Austrian winter peas.....	13, 105	54.3	50.7
Monantha vetch.....	17, 873	48.3	52.0
Hairy vetch.....	1 10, 453	47.1	50.8
Abruzzi rye.....	2 7, 022	32.7	36.8

<sup>1</sup> Seed in the 1930 plot proved to be smooth vetch.

<sup>2</sup> Seed in the 1932 plot proved to be Rosen rye instead of Abruzzi.

Ga. Coastal Plain Expt. Sta. Bull. 25. (Ann. Rept. 1934-35), 112 pp., illus. See pp. 36-38.

Stephens, J. L. Winter Legume Cover Crops \* \* \* Ga. Coastal Plain Expt. Sta. Bull. 23, 44 pp., illus. See pp. 31-35.

Stephens, J. L., agent, Bur. Plant Indus., U. S. Dept. Agr., Ga. Coastal Plain Expt. Sta., Tifton, Ga. Through correspondence of July 22, 1936.

## LOUISIANA

**Conducted by:** Louisiana Agricultural Experiment Station, Baton Rouge.

**Conducted at:** North Louisiana Experiment Station, Calhoun.

**Period:** 1930-35.

**Purpose:** To determine the effect of specified winter cover crops on the yield of corn.

**Soil:** There was some slope to the land in the direction in which the rows were run, from the limed to the unlimed part.

**Procedure and conditions:** Corn was planted in 5-row plots. The cover crops were seeded as early as possible in the fall after harvesting the crop previously grown, and turned under about April 10.

In 1930 one-half of each plot was limed with 1½ tons per acre of finely pulverized lime rock. In 1934 the second application of 1½ tons of lime per acre was made of waste lime from the Brown Paper Mill. This was done in the fall previous to planting the cover crops.

All fertilizer was applied when preparing to plant corn. Beginning with the 1932 crop, *all plots* received applications of 250 pounds of 18 percent superphosphate and 60 pounds of muriate of potash annually at time of planting corn.

**Miscellaneous:** The average rainfall in inches from April to July in 1931 was 2.74; 1932, 2.08; 1933, 7.38; 1934, 3.32; and 1935, 3.50.

**Results:** Given in table 15.

TABLE 15.—*Effects of specified winter cover crops on the yield of corn, Calhoun, La., 1931–35*

Winter cover crop	Yield of corn per acre										5-year average yield per acre 1931-35	
	1931		1932 <sup>1</sup>		1933		1934 <sup>1</sup>		1935		Limed	Unlimed
	Limed	Unlimed	Limed	Unlimed	Limed	Unlimed	Limed	Unlimed	Limed	Unlimed		
None.....	Bu. 25.9	Bu. 24.2	Bu. 14.2	Bu. 19.0	Bu. 12.4	Bu. 14.0	Bu. 9.6	Bu. 9.6	Bu. 11.5	Bu. 7.5	Bu. 14.7	Bu. 14.9
Southern bur-clover.....	29.5	30.3	7.8	12.0	30.0	27.5	25.9	22.3	24.6	26.9	<sup>2</sup> 23.6	23.8
Austrian winter peas.....	29.9	33.1	4.8	8.8	27.2	30.6	19.8	18.9	20.9	24.9	20.5	23.3
White Dutch clover.....	26.2	29.2	6.7	13.2	31.7	23.6	13.6	13.9	14.7	12.0	18.6	18.4
Purple vetch.....	24.2	28.7	14.3	16.4	26.6	20.0	18.4	19.5	18.2	25.0	20.3	21.9
Crimson clover.....	27.6	25.7	4.4	9.5	24.7	21.2	17.4	21.2	16.7	21.6	<sup>2</sup> 18.2	19.8
Hairy vetch.....	30.2	29.3	9.2	11.9	26.1	25.9	19.6	18.7	18.3	17.7	20.7	20.7
Hungarian vetch.....							19.0	17.7	20.3	22.2	<sup>3</sup> 19.6	<sup>3</sup> 20.0
Oats.....	13.9	28.2	10.8	16.5	12.2	10.4	7.1	9.9	6.0	6.4	10.0	14.3
Rye.....	26.5	27.8	12.5	17.7	13.8	11.7	9.5	7.1	8.2	7.5	14.1	14.4

<sup>1</sup> Corn replanted because of cutworm and budworm.

<sup>2</sup> Averaged according to rules of Department of Agriculture.

<sup>3</sup> 2-year average given in letter was 19.9.

Stewart, S., Supt., North La. Agr. Expt. Sta., Calhoun, La. Through correspondence of Mar 31, 1936.  
Summary Report of North La. Station. North La. Expt. Sta. Summary Rept., 24 pp. 1935. See p. 6.  
Stewart, S., Supt., North La. Agr. Expt. Sta., Calhoun, La. Through correspondence of Aug. 26, 1936.

## MISSISSIPPI

**Conducted by:** Mississippi Agricultural Experiment Station.

**Conducted at:** State College.

**Period:** 1928–35.

**Purpose:** To determine the effects of vetch, crimson clover, and rye cover crops on the yield of corn.

**Land history:** The land had been in cultivation 40 years. Corn was grown for the last 2 years before the experiment was started.

**Soil:** Ochlockonee loam. There was a 2-percent degree of slope and very little erosion.

**Procedure and conditions:** Plots were about one-twentieth of an acre in size and there were four replications. The same plots were used continuously throughout the experiment.

Land was prepared for corn by disking in the cover crops followed by a middle buster, and harrowed and dragged. Vetch and rye were



sown in the corn middles. The seed bed for crimson clover was pulverized with a Gee Whizz and covered lightly with a V-harrow.

Cover crops were planted October 1 to 15 at the following rates of seeding per acre: Vetch, 20 to 25 pounds; crimson clover, 15 pounds; rye, 5 pecks. Cocke's Prolific corn was planted May 10 to 20 with one stalk every 30 inches in 42-inch rows, except in 1932 and 1933; in those years corn was planted in 42-inch checks with two stalks in each hill. Cover crops were turned April 5 to 20.

No fertilizer was used on either the cover crops or corn.

**Results:** Given in table 16.

TABLE 16.—*Effects of specified winter cover crops on the yield of corn, State College, Miss., 1929-35*

Cover crops	Yield of corn per acre							
	1929	1930	1931	1932	1933	1934	1935	7-year average
	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>
None.....	27.2	22.4	37.4	27.4	37.2	28.4	22.1	29.2
Vetch.....	40.3	20.8	39.6	32.4	45.1	32.9	31.2	37.2
Crimson clover.....	32.9	20.4	38.0	31.4	44.9	30.1	25.8	31.8
Rye.....	24.9	17.2	40.0	28.3	38.9	28.8	19.5	28.9

A Compilation of Experimental and Other Data on Winter Legumes. Miss. Agr. Expt. Sta. Bull. 303, 37 pp., illus. 1934. See pp. 14, 15.

Dorman, C., chief agron., Miss. Agr. Expt. Sta., State College. Through correspondence of July 30, 1936. (The last 2 years and the 7-year average.)

## SOUTH CAROLINA

**Conducted by:** South Carolina Agricultural Experiment Station.

**Conducted at:** Clemson.

**Period:** 1926-28.

**Purpose:** To determine the effect of specified winter legumes and rye, turned under, (with and without a side dressing) on the yield of succeeding crops of corn.

**Land history:** Cotton, small grain, and corn had been on the land 25 years before the experiment was started. Rye and vetch had been used as cover crops every third year.

**Soil:** Cecil sandy-clay loam. There was 3 to 5 percent slope to the land with slight sheet erosion.

**Procedure and conditions:** Plots were one-half acre in size and were in duplicate. The experiment was conducted on the same land, each plot following itself each year.

Douthit's Prolific corn was planted in shallow water furrows. The rows were 4½ feet wide, and corn was spaced 15 to 18 inches in the drill.

Cover crops were turned under in the spring and in April corn was planted. Corn was harvested in October.

Two hundred pounds of superphosphate and 50 pounds of muriate of potash per acre were applied before corn was planted. When the corn was about knee-high, a portion of each plot was side dressed with 100 pounds of sulphate of ammonia per acre.

**Results:** Given in table 17.

TABLE 17.—*Effects of specified winter legumes and rye, turned under (with and without a side dressing), on the yield of succeeding crops of corn, Clemson, S. C., 1927-28*

Winter cover crop	Yield of corn per acre					
	Without side dressing			With side dressing		
	1927	1928	2-year average	1927	1928	2-year average
	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>
Rye.....	2.0	8.6	5.3	14.0	13.6	13.8
Rye and vetch.....	16.0	26.1	21.1	21.4	26.9	24.2
Vetch.....	18.6	18.3	18.5	26.0	25.3	25.7
Austrian peas.....	24.9	25.6	25.3	24.3	30.3	27.3
Crimson clover.....	16.3	22.8	19.6	16.0	27.8	21.9

Buie, T. S. Winter Cover Crop Experiments. S. C. Agr. Expt. Sta. Circ. 37, 14 pp., illus. 1929. See pp. 10, 11.

### TENNESSEE

**Conducted by:** Tennessee Agricultural Experiment Station.

**Conducted at:** Knoxville.

**Period:** 1907-12.

**Purpose:** To determine the effect of crimson clover on the yields of succeeding crops of corn.

**Soil:** The soil was a Cumberland loam, relatively poor in productivity. There was a 2-percent slope in the land.

**Procedure and conditions:** There were six plots, which included two replications. Each plot was one-fortieth of an acre in size. Corn rows were 3 feet wide.

Corn was grown continuously, both following crimson clover and where no cover crop was grown. Corn crops were cut and removed, after which the land was disked. Four plots were then sown to clover, and two left bare through the winter. Clover was first sown in the fall of 1907.

All plots were fertilized annually with 200 pounds of acid phosphate and 50 pounds of muriate of potash per acre.

**Miscellaneous:** Clover crops varied greatly from good to poor.

**Results:** Partially given in table 18.

TABLE 18.—*Effect of crimson clover on the yield of succeeding crops of corn, Knoxville, Tenn., 1908-12*

Disposition of clover crop <sup>1</sup>	Yield of corn per acre					
	1908	1909	1910	1911	1912	Average
	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>
None grown.....	34.1	40.2	29.7	25.3	24.8	30.8
Removed.....	34.1	58.9	46.5	32.9	36.8	41.8
Turned under.....	34.0	59.4	41.1	44.0	38.7	43.4

<sup>1</sup> Yields variable and seldom large.

Moore, C. A. The Effect of Various Legumes on the Yield of Corn. Tenn. Agr. Expt. Sta. Bull. 142, 16 pp., illus. 1930. See pp. 4, 5.

Tenn. Agr. Expt. Sta. Through correspondence received July 24, 1936.

## VIRGINIA

## EXPERIMENT A

**Conducted by:** Virginia Agricultural Experiment Station, Blacksburg, Va.

**Conducted at:** Augusta County Substation.

**Period:** 1924-29.

**Purpose:** To determine the effects of various cover crops on the yield of corn.

**Land history:** Had been cropped in a rotation of corn, wheat, clover, and timothy for 20 or more years.

**Soil:** The soil was Berks silt loam, the top soil being a grayish-brown silt loam and the subsoil a brownish-yellow silty clay containing soft shale fragments. It was relatively low in organic matter and less productive than the limestone soils of that section. The land was not well suited to the production of corn or other crops which required large amounts of moisture late in the growing season. There was a 5-percent degree of slope and a slight degree of erosion.

**Procedure and conditions:** Ten one-twentieth acre plots were plowed, disked, harrowed, and planted to Boone County white corn. The different cover crops were planted in the corn at the last cultivation. There were two replications. Cover crops were turned under the following spring and the plots again planted to corn. Corn was planted in 40-inch rows, spaced 20 inches in the drill. It was planted between April 20 and May 20 and harvested about October 1.

At the beginning of the experiment, 2 tons of ground limestone per acre were applied to the plots. All of the plots received an annual application of 300 pounds of 16-percent superphosphate and 40 pounds of muriate of potash per acre, broadcast immediately before planting corn. On one plot where no cover crop was grown there was an additional fertilizer treatment of 100 pounds of nitrate of soda per acre.

**Results:** Given in table 19.

TABLE 19.—*Effect of specified cover crops on the yield of corn, Augusta County Substation, Va., 1924-29*

Cover crop	6-year average yield of corn per acre	Increase due to cover crop	Cover crop	6-year average yield of corn per acre	Increase due to cover crop
	<i>Bushels</i>	<i>Bushels</i>		<i>Bushels</i>	<i>Bushels</i>
None.....	21.1		Vetch.....	37.5	16.4
None, nitrate of soda.....	35.3	<sup>1</sup> 14.2	Red clover.....	34.2	13.1
Cowpeas <sup>2</sup> .....	26.6	5.5	Sweetclover.....	28.8	7.7
Soybeans.....	30.9	9.8	Rye.....	17.9	-3.2
Crimson clover.....	35.8	14.7	Buckwheat.....	12.8	-8.3

<sup>1</sup> Increase due to nitrate of soda.

<sup>2</sup> Cowpeas were often killed by the first frost.

Gish, P. T., Hutcheson, T. B. Field Crops on Berks Shale Soil Respond to Lime and Fertilizers. Va. Agr. Expt. Sta. Bull. 292, 29 pp., illus. 1933. See pp. 3, 17-19.

Hutcheson, T. B., agron., Va. Agr. Expt. Sta. Through correspondence of July 27, 1936.

## EXPERIMENT B

**Conducted by:** Virginia Agricultural Experiment Station.

**Conducted at:** Blacksburg.

**Period:** 1911-26.



**Purpose:** To determine the effects of crimson clover and vetch used as winter cover crops on the yield of succeeding crops of corn.

**Land history:** In timothy and clover, and rotations of corn, wheat, and clover for 30 years.

**Soil:** The soil was a Hagerstown silt loam which was derived from limestone rock. The soil was one of the most productive in Virginia and representative of all the limestone soils of the State.

When no green manure crop was grown, the land was washed so badly most of the top soils had washed away exposing the subsoil in places. On land with the green manure cover crop there was no evidence of washing. The land had a 10-percent slope.

**Procedure and conditions:** Plots were one-twentieth acre in size. Silver King corn was used. It was planted in 40-inch rows and spaced 20 inches in the drill. The land was plowed, disked, and harrowed. Corn was planted between May 15 and 20. The same land was used continuously.

When starting this experiment in 1911 the plan was to seed the crimson clover in the corn at the last cultivation, turning the clover crop under for the next corn crop. This was to be compared with corn grown without a green manure crop. Poor stands of green manure were generally secured. In 1917, and thereafter, vetch was seeded in addition to the crimson clover. With the exception of 1920 fairly good stands were secured.

Corn under both treatments was fertilized annually with 400 pounds of acid phosphate and 50 pounds of muriate of potash per acre, applied broadcast before planting.

**Miscellaneous:** The limestone soils of Virginia are located west of the Blue Ridge Mountains. Blacksburg is 2,150 feet above sea level, and the growing season is somewhat shorter than in some of the other sections of western Virginia where the altitude is less.

**Results:** For the period 1918-26 are given in table 20.

TABLE 20.—*Effect of crimson clover and vetch, on the yield of succeeding crops of corn, Blacksburg, Va., 1918-26*

Cover crop	9-year average yield of corn per acre	Percent-age of marketable corn
None	<i>Bushels</i> 6.4	<i>Per cent</i> 53.0
Crimson clover and vetch <sup>1</sup>	31.1	82.7

<sup>1</sup> Turned under.

Wolfe, T. K., Kipps, M. S. The Effects of Rotations, Fertilizers, Lime, and Organic Matter on the Production of Corn, Wheat, and Hay. Va. Agr. Expt. Sta. Bull. 253, 50 pp., illus. 1927. See pp. 3, 4, 47, 48.

Hutcheson, T. B., agron., Va. Agr. Expt. Sta. Through correspondence of July 27, 1936.

## EXPERIMENT C

**Conducted by:** Virginia Agricultural Experiment Station.

**Conducted at:** Blacksburg.

**Period:** 1916-26.

**Purpose:** To compare the effects of a mixture of crimson clover and vetch, with rye as winter cover crops.

**Land history:** In rotation of corn, wheat, grass, and clover 20 years or more before experiment was started.

**Soil:** The soil was a Hagerstown silt loam which was derived from limestone rock. The limestone soils around Blacksburg were one of the most productive soils of Virginia and of the same general nature as all limestone soils of the State. The land had a 10-percent slope and was slightly eroded.

**Procedure and conditions:** Plots were one-tenth acre in size. The land was plowed, disked, and harrowed and planted to Silver King corn. At the last cultivation each year two plots were seeded to a mixture of crimson clover and vetch. Two plots were seeded to Abruzzi rye after the corn was harvested, and one plot left without seeding to any green manure crop. The following spring one plot of crimson clover and vetch and one of rye were cut for hay. All plots were then plowed and planted to corn. The same plots were used continuously. Corn was planted in 40-inch rows, and spaced 20 inches in the drill. It was planted between May 15 and May 20 and harvested on October 1.

At the time of harvesting and turning under the cover crops the rye was just beginning to head well and the crimson clover and vetch were just beginning to bloom. On plots where cover crops were cut for hay, the average yield of crimson clover and vetch was approximately 3 tons of green material per acre while rye yielded about 5 tons per acre as an average for the 10 years. The crimson clover and vetch crops for 1917 and 1920 were failures.

At the time of planting corn an application of 400 pounds of acid phosphate and 50 pounds of muriate of potash per acre was broadcast on all plots.

**Miscellaneous:** Limestone soils of Virginia are located west of the Blue Ridge Mountains. Blacksburg is 2,150 feet above sea level and the growing season is somewhat shorter than in some of the other sections of western Virginia where the altitude is less.

**Results:** Given in table 21.

TABLE 21.—*Effect of crimson clover and vetch, and rye, on the 8-year average yield of succeeding crops of corn, Blacksburg, Va., 1916-26*

Cover crop	Disposition of cover crop	8-year <sup>1</sup> average yield of corn per acre
		<i>Bushels</i>
None.....		30.7
Rye.....	Turned under.....	24.1
Do.....	Cut for hay.....	26.1
Crimson clover and vetch <sup>2</sup> .....	do.....	41.2
Do <sup>2</sup> .....	Turned under.....	45.9

<sup>1</sup> No record kept of corn for 1921 and 1924 because of poor stands.

<sup>2</sup> Crimson clover and vetch crops for 1917 and 1920 were failures.

Wolfe, T. K., Kipps, M. S. The Effects of Rotations, Fertilizers, Lime, and Organic Matter on the Production of Corn, Wheat, and Hay. Va. Agr. Expt. Sta. Bull. 253, 50 pp., illus. 1927. See pp. 3, 4, 44, 45.

Hutcheson, T. B., agron., Va. Agr. Expt. Sta. Through correspondence of July 27, 1936.

# EFFECTS OF SPECIFIED WINTER SOIL-CONSERVING CROPS ON YIELDS OF PEANUTS IN—

## FLORIDA

### EXPERIMENT A

**Conducted by:** Agronomy department, Florida Agricultural Experiment Station, Gainesville, in cooperation with P. E. Turner.

**Conducted at:** Bascom, Jackson County, Fla.

**Period:** 1932-33.

**Purpose:** To determine the effect of winter legume cover crops on the yield of Spanish peanuts.

**Land history:** The land had been in corn, peanuts, and velvetbeans during the years 1930-32. Seventy-five pounds per acre of fertilizer was applied in 1932.

**Soil:** Norfolk sandy loam, with a light sandy subsoil. The field was of average fertility.

**Procedure and conditions:** All treatments were in quadruplicate plots one-fifth acre in size. Peanuts were in rows 30 inches wide and 316.8 feet long.

Cover-crop seeds were sown broadcast on October 18, 1932, at the following rates per acre: Austrian peas, 40 pounds; monantha vetch, 35 pounds; and hairy vetch, 30 pounds. This was followed by flat breaking the land.

Green weights of cover crops were taken in each plot on April 4, 1933, from 3 squares measuring 8 feet by 8 feet.

Spanish peanuts were planted May 5, 1933, in rows 30 inches wide and spaced 3½ inches in the row.

Fertilizer was sown broadcast at the time of seeding the cover crops.

**Miscellaneous:** A very fine stand of peanuts was secured on all plots.

**Results:** Given in table 22.

TABLE 22.—*Effect of winter legume cover crops on the yield of Spanish peanuts, Bascom, Jackson County, Fla., 1933*

Cover crop	Fertilizer per acre (pounds)	Average yield per acre		
		Cover crop	Peanuts	Peanut hay
		Pounds	Bushels	Pounds
Check.....	0 superphosphate.....		29.0	563
Do.....	400 superphosphate.....		32.6	812
Austrian peas.....	do.....	9,365	40.5	1,000
Monantha vetch.....	do.....	9,847	41.9	1,062
Hairy vetch.....	do.....	9,331	41.7	1,062
Average of legume plots.....		9,514	41.4	1,041

Stokes, W. E., agron., Fla. Agr. Expt. Sta., Gainesville, Fla. Through correspondence of Aug. 6, 1936. (Unpublished data.)

### EXPERIMENT B

**Conducted by:** Florida Agricultural Experiment Station, Gainesville.

**Conducted at:** Jackson County.

**Period:** 1931-32.



**Purpose:** To determine the effects of specified winter legumes, with and without superphosphate, on the yield of Spanish peanuts.

**Soil:** Norfolk sandy loam.

**Procedure and conditions:** Single  $\frac{1}{2}$ -acre plots for each treatment were used on three farms.

Half of the plots received superphosphate at the rate of 400 pounds per acre, applied broadcast at planting of cover crops.

**Results:** Given in table 23.

TABLE 23.—Effect of specified winter legumes, with and without superphosphate, on the yield of Spanish peanuts, Jackson County, Fla., 1932

Cover crop	Average yield per acre			
	No superphosphate		Superphosphate <sup>1</sup>	
	Cover crop <sup>2</sup>	Peanuts	Cover crop <sup>2</sup>	Peanuts
	Pounds	Bushels	Pounds	Bushels
None.....		32.2		35.0
Austrian winter peas.....	3,766	36.2	7,529	38.7
Monantha vetch.....	3,620	34.8	8,621	36.4
Hairy vetch.....	3,754	36.4	7,903	38.7
Average of legume plots.....	2,713	35.8	8,018	37.9

<sup>1</sup> 400 pounds per acre.

<sup>2</sup> Green weight yields.

Fla. Agr. Expt. Sta. (Ann. Rept.), 211 pp., illus. 1933. See p. 50.

## EFFECTS OF SPECIFIED WINTER SOIL-CONSERVING CROPS ON YIELDS OF PECANS IN—

### FLORIDA

**Conducted by:** Florida Agricultural Experiment Station, Gainesville.

**Conducted at:** Monticello, Jefferson County.

**Period:** 1927–34.

**Purpose:** To determine the effects of cover crops and nitrogenous fertilizers on growth and yield of Frotscher and Stuart pecan trees. The effects of legumes grown in winter and in summer were compared with combinations of nonlegumes in winter and legumes in summer, and with no planted cover crops.

**Land history:** The trees had been set 17 to the acre in 1904 and were, therefore, 23 years old when the experiment was started in 1927. They were rather uniform, although they had been in low production for several years prior to 1927 when there were no planted cover crops and practically no fertilizers. The 1928 production was preceded by several years of no yields or light ones.

**Soil:** The land was slightly rolling with no appreciable erosion and classified as Norfolk fine sandy loam.

**Procedure and conditions:** In 1927, the block of trees set off for this experiment was divided into four plots, each, of the varieties Frotscher and Stuart, three planted to cover crops, and one used as a check where nothing was planted. Planted plots each contained 12 Frotscher and 12 Stuart trees, respectively, and the unplanted plots 6 of each variety. In 1930, all plots were divided equally into two sections, A and B. Therefore, there were six trees of each variety in the corresponding sections of the planted plots, and three in the unplanted.

Austrian peas, hairy vetch, and oats, respectively, were grown during the winter on cover-crop plots 1, 2, and 4, and *Crotalaria spectabilis* during the summer. (Rye was grown instead of oats in

1928-29 and 1929-30.) No crops, winter or summer, were planted on plot 3. Initial plantings were made in 1927 and growth and yield records started in 1928. Seed in pounds per acre was sown annually in the following amounts: Hairy vetch, 20; Austrian peas, 30; oats, 64; and rye, 60. *Crotalaria spectabilis* was planted in 1928 and 1931 only, at the rate of 6 pounds per acre. It volunteered in all other years. Legumes were inoculated with a commercial product at the time of planting.

All plots were cultivated by either disking or shallow plowing each fall in preparation for planting winter cover crops. The soil was again disked each spring except in years when there was an exceptionally heavy growth of winter crops; at such times the plants were allowed to die down and form a mulch over the soil, no cultivation being given to any of the plots.

All plots were fertilized annually at the rate of 300 pounds of 16-percent superphosphate and 60 pounds of sulphate of potash per acre. Applications were made broadcast just before or at the time of seeding winter cover crops. From 1930 to 1934, the B section of each plot received additional annual applications of sulphate of ammonia at the rate of 340 pounds per acre applied broadcast during June or July.

**Miscellaneous:** Average annual rainfall at Monticello was as follows: 1927, 37.33; 1928, 86.47; 1929, 70.83; 1930, 62.89; 1931, 37.67; 1932, 61.24; 1933, 51.11; and 1934, 51.25 inches.

Both leaf and nut case-bearers caused severe damage throughout the experiment, tending to lower the yields. The majority of Stuart trees developed varying amounts of rosette (on account of previous soil management) after the experiment was started, tending to reduce the yields to a marked degree.

**Results:** Given in table 24.

TABLE 24.—*Effects of cover crops and fertilizer on the growth and yield of Frotscher and Stuart pecan trees, Monticello, Fla., 1928-34*

SUPERPHOSPHATE AND SULPHATE OF POTASH PLOTS

Plot no.	Winter cover crop <sup>1</sup>	Increase per tree in cross section of trunk						Average yield per acre					
		Frotscher			Stuart			Frotscher			Stuart		
		1928-34	1928-31	1932-34	1928-34	1928-31	1932-34	1928-34	1928-31	1932-34	1928-34	1928-31	1932-34
		Sq. in.	Sq. in.	Sq. in.	Sq. in.	Sq. in.	Sq. in.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
3-A	None—check <sup>2</sup>	5.2	5.7	4.4	3.6	3.6	3.5	154.7	105.4	221.0	85.0	90.1	78.2
1-A	Austrian peas	7.4	7.0	8.1	6.6	6.5	6.8	345.1	153.0	600.1	180.2	122.4	250.4
2-A	Hairy vetch	7.3	6.6	8.2	6.2	5.1	7.6	323.0	132.6	578.0	178.5	134.3	239.7
4-A	Oats <sup>3</sup>	5.6	6.2	4.9	4.8	4.6	5.1	119.0	103.7	139.4	120.7	102.0	144.5

SULPHATE OF AMMONIA, SUPERPHOSPHATE, AND SULPHATE OF POTASH PLOTS

3-B	None—check <sup>2</sup>	5.5	4.2	7.2	5.1	5.1	5.1	215.9	154.7	297.5	122.4	85.0	171.7
1-B	Austrian peas	8.6	8.2	9.2	9.1	8.2	10.3	537.2	214.2	967.3	232.9	124.1	377.4
2-B	Hairy vetch	9.2	9.2	9.2	7.1	6.3	8.2	501.5	147.9	970.7	217.6	122.4	343.4
4-B	Oats <sup>3</sup>	6.5	5.5	7.7	6.1	5.7	6.6	141.1	119.0	168.3	108.8	103.7	115.6

<sup>1</sup> *Crotalaria spectabilis* grown in summer.

<sup>2</sup> Check plot not planted to winter or summer crop. There was, however, a light growth of native vegetation.

<sup>3</sup> Rye grown instead of oats in 1928-29 and 1929-30.

Blackmon, G. H., Barnette, R. M. A Cover Crop Program for Florida Pecan Orchards. Fla. Agr. Expt. Sta. Bull. 297, 44 pp., illus. 1936. See pp. 7, 9, 11, 13, 14, 16, 18, 25.

EFFECTS OF WINTER SOIL-CONSERVING CROPS ON YIELDS OF  
WHEAT IN—

## OKLAHOMA

**Conducted by:** Oklahoma Agricultural Experiment Station, Stillwater.

**Conducted at:** Farm of A. E. Ford, Carrier, Okla.

**Period:** 1929–33.

**Purpose:** To determine the immediate and residual effects of Austrian winter peas and wheat plowed under, on the yield of wheat.

**Procedure and conditions:** Austrian winter peas were well inoculated. A heavy crop was obtained and plowed under on May 27, 1929. Wheat on another plot was plowed under at the same time. The plants were about 18 to 24 inches tall at that time and it was just before the major portion of the heads appeared. No green manure crops were used after 1929.

**Results:** Given in table 25.

TABLE 25.—*Immediate and residual effects of Austrian winter peas and wheat plowed under on the yield of wheat, Carrier, Okla., 1929–33*

Treatment	Yield of wheat per acre, 1929	Immediate and residual effects of green manure crops on yield of wheat per acre				3-year average yield of wheat, 1931-33
		Immediate	Residual			
			1930	1931	1932	
	<i>Bushels</i> 13.4	<i>Bushels</i> 18.5	<i>Bushels</i> 28.1	<i>Bushels</i> 18.9	<i>Bushels</i> 24.3	<i>Bushels</i> 23.8
Wheat—check		42.2	35.0	24.5	27.0	28.8
Austrian winter peas <sup>1</sup>		32.3	28.0	19.0	22.1	23.0
Wheat <sup>1</sup>						

<sup>1</sup> Plowed under May 27, 1929. Wheat heads just beginning to appear.

Solving Oklahoma Farm Problems. Okla. Agr. Expt. Sta. Rept., 397 pp., illus. 1930–32. See p. 20. Harper, H. J., Professor, Soils, Okla. Agr. and Mech. Col., Stillwater, Okla. Through correspondence of July 24, 1936.

EFFECTS OF WINTER SOIL-CONSERVING CROPS ON  
YIELDS OF SUGARCANE IN—

## LOUISIANA

**Conducted by:** Louisiana Agricultural Experiment Station, Baton Rouge.

**Conducted at:** Sugar Experiment Station, Audubon Park, New Orleans.

**Period:** 1917–22.

**Purpose:** To determine the effect of *Melilotus indica* (also called yellow sweetclover and sour clover) as a catch crop on the yield of fall plant sugarcane.

**Land history:** Before the experiment was started the land was in a regular cane rotation.

**Procedure and conditions:** There were two replications of plots. The experiment was not run on the same land each year.

Sugarcane was planted in rows 6 feet wide. *Melilotus indica* was broadcast on a thoroughly prepared seedbed.



The average date of planting *Melilotus* was October 10, the latest date November 1; and the average date of harvesting was March 1; the latest March 20.

In 1918 *Melilotus indica* was allowed to grow until late spring when it was in full bloom. In so doing the stand of cane was severely injured and the experiment was abandoned for that year. Until 1921 home-grown uncleaned seed was satisfactorily used without inoculation. In 1921, clean seed was bought and sown without inoculation. A good stand was secured but poor inoculation was observed. The clover was allowed to grow too long in the spring before turning it under and this late turning under caused poor germination in the cane. The reason for the delay was the studying of the effects of poor inoculation. The *Melilotus* yields for the year 1921 are given in the table below but are not included in the average. The 1922 crop was inoculated with fine soil taken from a field on which *Melilotus* had grown the previous year.

All plots were fertilized with 250 pounds of acid phosphate per acre. The check plots were cropped continuously to sugarcane, and received no application of nitrogen.

**Results:** Given in table 26.

TABLE 26.—Effect of "*Melilotus indica*", as a catch crop, on the yield of fall plant sugarcane, Audubon Park, New Orleans, La., 1917-22

Year <sup>1</sup>	Stalks per acre				Yield of sugarcane per acre		Percentage of sucrose in juice	
	Spring count		Fall count		<i>Melilotus</i>	No cover crop check	<i>Melilotus</i>	No cover crop check
	<i>Melilotus</i>	No cover crop check	<i>Melilotus</i>	No cover crop check				
	Number	Number	Number	Number	Tons	Tons	Percent	Percent
1917.....	9,493	9,004	20,464	13,935	16.7	8.2	10.21	10.09
1919.....	13,933	8,781	10,308	9,827	14.1	11.9	10.10	10.20
1920.....	7,101	7,405	15,913	15,057	9.1	8.9	12.52	12.45
1921.....	3,654	3,871	9,413	17,028	8.0	12.7	12.50	12.67
1922.....	5,635	5,433	19,413	16,203	16.4	10.5	10.25	11.31
Average <sup>2</sup> or percentage.....	9,040	7,656	16,524	13,756	14.1	9.9	10.77	11.01

<sup>1</sup> 1918 results unavailable; cane severely injured by matured *Melilotus*.

<sup>2</sup> 1921 not included.

Taggart, W. G. *Melilotus indica* on Fall Plant Sugarcane. La. Agr. Expt. Sta. Bull. 189, 11 pp., 1923. See pp. 5, 6.

Sturgis, M. B., Professor of Agron., La. State Univ., Baton Rouge. Through correspondence of Aug. 6, 1936.

## EFFECTS OF WINTER SOIL-CONSERVING CROPS ON YIELDS OF KALE IN—

### VIRGINIA

**Conducted by:** Virginia Truck Experiment Station, in cooperation with the Bureau of Plant Industry, United States Department of Agriculture.

**Conducted at:** Norfolk.

**Period:** 1907-12.

**Purpose:** To determine the response of vegetable crops to different fertilizers and manurial treatments. The following three phases only are given in these results: (1) Potatoes followed by crimson clover, turned under; (2) potatoes followed by crimson clover and lime, turned under; and (3) potatoes followed by corn.

**Land history:** Had not been in cultivation for a number of years. No fertilizer of any kind had previously been used on it.

**Soil:** Classified by the Bureau of Soils, United States Department of Agriculture, as Leonardtown gravelly loam, grading into Norfolk fine sandy loam. It was fairly level and there was no erosion.

**Procedure and conditions:** In the fall of 1907 weeds and grasses were cut and raked off, the land plowed and sown to rye. The growth of rye during the winter 1907-8 indicated a uniform tract of land but one containing little available soil fertility.

The tract was divided into 2 blocks, each containing 20 plots, with an alley 3.3 feet wide between the plots and a driveway 16½ feet wide between the blocks. There were no replications of the plots. Each plot was one-twentieth of an acre in size and was subdivided into eight sections. Results given in the table below are from sections 4, 5, and 6 on all the plots. The experiment was run continuously on the same land, each plot following itself each year.

Each plot received annually a separate and distinct commercial fertilizer treatment, while the various sections in the plots were subjected to different cropping systems and soil treatments.

Sections 4 of all the plots were planted to potatoes in March 1908-11, with corn following the potatoes in July each year. In 1912 the spring crop was omitted and corn was planted in May.

Sections 5 of all the plots were planted to potatoes in March 1908-11, and crimson clover was sown after the potatoes were dug each year. Crimson clover was turned under for potatoes in the early spring, 1909-11.

Sections 6 of all the plots were treated the same as sections 5, except that applications of 1,500 pounds of hydrated lime per acre were made before planting potatoes, 1908-11. No lime was applied in 1912.

In 1912 the crimson clover on sections 5 and 6 was turned under early in July and the surface of the ground given clean culture to control weeds.

On August 7, 1912, the entire tract was planted to Dwarf Green Curled Scotch kale in rows 33 inches in width and spaced 12 inches in the drill. Germination was good, but plants on sections 4, which had no phosphoric acid, died in a few days. They were reseeded August 19 and again died. On September 20-23 good stands were obtained by transplanting from other portions of the field.

Fertilizer was applied broadcast each year, as indicated in the table given below, immediately before planting the spring crops 1908-11, and on August 6, 1912, the day before seeding kale.

The data given in the table below have been brought into 10 groups with respect to the similarity of the commercial fertilizer treatments used. Each group represents the average yield of the plot, or plots, receiving the treatments indicated in the column at the left of the table.

**Miscellaneous:** Weather was very dry from July through September. The total rainfall for 6 months, July through December

1912, was 15.19 inches, and the 36-year average total for that same period of the year was 25.95 inches.

**Results:** The results from sections 4, 5, and 6 of all the plots are given in table 27.

TABLE 27.—Average yields of kale as influenced by different fertilizers and crop rotations, Norfolk, Va., 1912

Commercial fertilizer <sup>1</sup>	Amount of fertilizer per acre	Average yield of kale per acre, <sup>2</sup> 1912		
		Sec. 4—Potatoes followed by corn, no green manure crop <sup>3</sup>	Green manure crop	
			Sec. 5—Potatoes followed by crimson clover <sup>4</sup>	Sec. 6—Potatoes followed by crimson clover and lime <sup>4</sup>
	Pounds	Pounds	Pounds	Pounds
None; check plots.....		1,792	3,344	10,656
Nitrogen, phosphoric acid, and potash.....	4,000	12,160	17,216	23,984
Do.....	2,000	12,960	16,096	23,712
Cottonseed meal and Peruvian guano.....	( <sup>5</sup> )	5,680	10,752	19,632
Dried fish, blood and bone, dissolved bone, and ground bone.....	( <sup>5</sup> )	10,704	15,056	20,096
Nitrate of soda and acidulated phosphate rock.....	1,000	9,728	13,088	14,560
Nitrate of soda and muriate of potash.....	1,000	0	688	4,432
Nitrate of soda and sulphate of ammonia.....	( <sup>5</sup> )	1,584	2,048	7,136
Acidulated rock phosphate and unacidulated rock phosphate.....	( <sup>5</sup> )	7,216	15,648	15,968
Kainit, sulphate of potash, and wood ashes.....	( <sup>5</sup> )	672	4,976	9,408
Average yield.....		6,240	9,888	14,960

<sup>1</sup> Each plot received different commercial fertilizer treatments and was divided into 8 sections, receiving different cropping systems and soil treatments.

<sup>2</sup> Calculated on a per-acre basis by H. H. Zimmerley, Director of Virginia Truck Experiment Station, Norfolk.

<sup>3</sup> No humus except roots of corn and potatoes.

<sup>4</sup> Crimson clover turned under.

<sup>5</sup> Average.

Johnson, T. C. Truck Crop Investigations—Kale Fertilizers. Va. Truck Expt. Sta. Bull. 9, pp. 175-203, illus. 1913. See pp. 175, 177, 181, 202.

Zimmerley, H. H., Dir., Va. Truck Expt. Sta., Norfolk, Va. Through correspondence of July 18, 1936.

## II. EFFECTS OF TESTED PRACTICES USED IN GROWING WINTER SOIL-CONSERVING CROPS ON YIELDS OF SUCCEEDING CROPS

### EFFECTS OF DATES OF TURNING UNDER WINTER SOIL-CONSERVING CROPS ON THE YIELDS OF COTTON IN—

#### ALABAMA

##### EXPERIMENT A

**Conducted by:** Alabama Agricultural Experiment Station.

**Conducted at:** Auburn.

**Period:** 1924-29.

**Purpose:** To determine the effect of vetch, turned under at different stages of growth, on the yield of cotton.

**Land history:** In cotton and corn for 25 years or more. No record of cover crops having been on land.

**Soil:** Norfolk sandy loam. The degree of slope was about 5 percent.



**Procedure and conditions:** Plots were one-thirtieth of an acre. The same land was used continuously. Vetch was used as a cover crop each year.

It was turned on about March 25, April 5, and April 15. About 10 days or 2 weeks later the land was bedded and planted to Cook's Wilt-Resistant cotton in 3½-foot rows, approximately two plants to every 18 inches.

All plots received annual applications of 600 pounds superphosphate and 75 pounds muriate of potash per acre, one-fourth of which was applied before planting, the remainder as a side dressing.

**Results:** Given in table 28.

TABLE 28.—*Effects of vetch, turned under at different stages of growth, on the yield of cotton, Auburn, Ala., 1925-29*

Treatment	Date of—		5-year average yield per acre		Increase cotton
	Turning under	Planting cotton	Vetch <sup>1</sup>	Seed cotton	
None.....		Apr. 5	Pounds	Pounds	Pounds
Nitrate of soda <sup>2</sup> .....		do.....		373	
Vetch.....	Mar. 25	do.....	4,542	1,034	661
Do.....	Apr. 5	Apr. 20	9,757	966	593
Do.....	Apr. 15	Apr. 30	9,992	907	534
Nitrate of soda <sup>2</sup> .....		do.....		833	460
				985	612

<sup>1</sup> Green weight.

<sup>2</sup> 300 pounds per acre, annually.

Bailey, R. Y., Williamson, J. T., Duggar, J. F. Experiments with Legumes in Alabama. Ala. Agr. Expt. Sta. Bull. 232, 44 pp., illus. 1930. See pp. 14, 16-18.

Tidmore, J. W., head, Dept. of Agron. and Soils, Ala. Poly. Inst., Auburn, Ala. Through correspondence of July 25, 1936.

## EXPERIMENT B

**Conducted by:** Alabama Agricultural Experiment Station.

**Conducted at:** Auburn.

**Period:** 1925-29.

**Purpose:** To determine the best time to turn vetch for corn, to compare yields following vetch and nitrate applications, and to determine the best spacing for corn.

**Land history:** In cotton or corn for 25 years. No record of cover crops having been grown.

**Soil:** Norfolk sandy loam. The land sloped a little and was slightly eroded.

**Procedure and conditions:** There were 13 plots one-thirtieth acre in size for spacing tests, one-fifteenth acre for fertilizer treatments. The same land was used continuously. Rows were 5 feet, plants spaced 18 and 36 inches in the drill. The experiment was divided into two sections for spacing tests.

The land was turned, rows laid off, and Whatley's corn planted in water furrows.

Vetch was turned under on March 25, April 5, and April 15.

Corn was planted April 5, April 20, and May 1.

In January 1928 vetch was killed by frost. Immediately after the freeze this land was plowed to destroy the scattered plants that had not been killed. In order to test the residual effect of the vetch which

had been turned during the 3 years, 1925-27, corn was planted in 1928. While the yields of 1928 are shown separately, they are also included in the 1925-29 average.

All plots were fertilized uniformly with phosphate and potash. Adjacent to each vetch plot were two plots treated with nitrate of soda and with no cover crop. The rate of application of nitrate of soda to these plots was increased as the date of turning the vetch was delayed.

**Results:** The 1925-29 results of the experiment and the 1928 residual results are given in table 29.

TABLE 29.—*Effects of vetch, turned under at different stages of growth, on the yield of corn spaced 18 inches and 36 inches in the drill, and the residual effect of 3 years of vetch on the yield of corn, Auburn, Ala., 1925-29*

Plot no.	Fertilizer (pounds) <sup>1</sup>	Date of—		4-year average green weight yield of vetch per acre, <sup>2</sup> 1925-27, 1929	5-year average yield of corn <sup>3</sup> per acre, 1925-29		Residual yield of corn per acre, 1928	
		Turning vetch	Planting corn		18-inch spacing	36-inch spacing	18-inch spacing	36-inch spacing
1, 5, 9, 13	None		Apr. 5	Pounds	Bushels	Bushels	Bushels	Bushels
2	100 nitrate soda		do		7.1	8.9	9.5	7.6
3	200 nitrate soda		do		13.9	13.0	11.7	12.1
4	Vetch	Mar. 25	do		19.4	15.2	22.6	14.7
6	200 nitrate soda		Apr. 20	5, 259	22.6	19.6	16.0	13.9
7	300 nitrate soda		do		22.1	20.9	22.0	15.7
8	Vetch	Apr. 5	do	8, 849	25.4	21.7	26.3	16.9
10	200 nitrate soda		May 1		29.3	24.9	28.9	17.6
11	400 nitrate soda		do		22.1	19.4	25.0	21.7
12	Vetch	Apr. 15	do	12, 072	26.6	22.3	36.8	29.0
					29.5	25.8	34.6	22.8

<sup>1</sup> All plots received 400 pounds of superphosphate and 50 pounds of muriate of potash per acre in 1925 and 1926; 1 ton of 16-percent basic slag per acre was applied to the vetch plots in the fall of 1926, and to all other plots in the spring of 1927. No mineral fertilizers have been applied since the spring of 1927. Nitrate of soda given in pounds per acre.

<sup>2</sup> Vetch was killed by cold in January 1928.

<sup>3</sup> Yields in 1925 were very low, due to drought.

Bailey, R. Y., Williamson, J. T., Duggar, J. F. Experiments with Legumes in Alabama. Ala. Agr. Expt. Sta. Bull. 232, 44 pp., illus. 1930. See pp. 14-15, 18-19.

Tidmore, J. W., head, Dept. of Agron. and Soils, Ala. Poly. Inst., Auburn, Ala. Through correspondence of July 25, 1936.

## EFFECTS OF DATES AND METHOD OF TURNING UNDER WINTER SOIL-CONSERVING CROPS ON THE YIELDS OF CORN IN—

### GEORGIA

**Conducted by:** Georgia Coastal Plain Experiment Station in cooperation with the United States Department of Agriculture.

**Conducted at:** Tifton.

**Period:** 1930-33.

**Purpose:** To determine the effects of the date and method of plowing under Austrian winter peas on yields of succeeding crops of corn.

**Land history:** Before this experiment was started, the land was cropped to corn, cotton, and peanuts in rotation.

**Soil:** The soil was a Tifton sandy loam. The land sloped gently and there was very little erosion.

**Procedure and conditions:** There were two replications of the plots in the experiment, each plot being one-twentieth acre in size. No

regular rotation was followed, but other crops grown were cotton, peanuts, and soybeans, but not in regular order. Each year Whatley's Prolific corn was planted on different land, following Austrian winter peas as the cover crop.

The seed of Austrian winter peas was inoculated with a commercial inoculating culture. October 7 was the average date of seeding Austrian winter peas.

Cover crops were turned at 15-day intervals from February 1 through April 15. Plot 8 was prepared by listing the land with a two-horse plow, which turned under the peas and left a furrow in which the corn was planted after the furrow had been put in shape by splitting the "balk" with a shovel plow or scooter. The land was then planted to corn immediately.

Plot 9 was prepared by laying off rows with a large scooter and planting corn in the furrows. Austrian winter peas were allowed to grow until the corn was about 10 inches high. The rows were then barred off with a turning plow, which covered the peas and prepared the corn for further cultivation.

On plot 10 the peas were killed by mowing 1 week before the land was turned.

About April 15 all plots were planted to corn spaced from 18 inches to 2 feet in the drill. Rows were 4 feet apart.

Phosphate and potash were applied before planting at the rate of 500 pounds of 10-0-4 per acre. The fertilizer was applied with a fertilizer distributor.

**Results:** Given in table 30.

TABLE 30.—*Effects of date and method of plowing under Austrian winter peas on the yield of succeeding crops of corn, Tifton, Ga., 1931-33*

Plot no.	Date of turning	Disposition of crop	Yield of corn per acre			
			1931	1932	1933	3-year average
			<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>
1	No cover crop.....		25.7	20.9	40.2	28.9
2	Feb. 1.....	Plowed under.....	30.0	38.9	52.0	40.3
3	Feb. 15.....	do.....	31.5	42.9	57.3	43.9
4	Mar. 1.....	do.....	35.9	44.3	52.4	44.2
5	Mar. 15.....	do.....	35.7	47.7	53.3	45.6
6	Apr. 1.....	do.....	34.4	50.3	46.7	43.8
7	Apr. 15.....	do.....	38.8	32.7	37.7	36.4
8	do.....	Listed <sup>1</sup> .....	36.6	36.0	34.5	35.7
9	do.....	Furrowed <sup>2</sup> .....	27.2	33.6	27.7	29.5
10	do.....	Mowed <sup>3</sup> .....	31.5	40.9	47.8	40.1

<sup>1</sup> Corn was planted immediately after the peas had been turned under by listing.

<sup>2</sup> Corn was planted in the pea furrows. When it was 10 inches high the peas were covered with a turning plow.

<sup>3</sup> Mowed 1 week before turning under.

Stephens, J. L. Winter Legume Cover Crops \* \* \* Ga. Coastal Plain Agr. Expt. Sta. Bull. 23, 44 pp., illus. 1934. See pp. 5, 38, 39.

Stephens, J. L., agent, Bur. Plant Indus., U. S. Dept. Agr., Ga. Coastal Plain Expt. Sta., Tifton, Ga. Through correspondence July 22, 1936.

## EFFECTS OF LIMING ON THE YIELDS OF COTTON IN—

### GEORGIA

**Conducted by:** Georgia Coastal Plain Experiment Station.

**Conducted at:** Tifton.

**Period:** 1921-31.



**Purpose:** To determine the value of lime and green manure with varying amounts of fertilizer in a 3-year rotation of cotton, corn, and oats. (Corn yields given in table 32; oats in table 33.)

**Procedure and conditions:** Previous to 1926 a cover crop of cowpeas was turned under, following oats in the rotation. From 1926 through 1931 a winter green manure crop of Austrian winter peas was grown in addition to the cowpea cover crop.

Whatley's Prolific corn and Petty's Toole cotton were used. Fulghum variety of oats was used from 1922 through 1928. The variety was changed to Hundred Bushel in 1929.

One and one-half tons of ground limestone were applied every 3 years to the limed plots.

An 8-2-6 (phosphoric acid, ammonia, and potash) fertilizer was applied at the time of planting cotton and corn in amounts varying from 200 to 400 pounds per acre.

**Results:** For cotton given in table 31.

TABLE 31.—*Effect of lime and green manure on the yield of seed cotton in a 3-year rotation, Tifton, Ga., 1922-29*

Treatment	Fertilizer per acre	Yield of cotton per acre <sup>1</sup>								
		1922	1923	1924	1925	1926	1927	1928	1929	8-year average
		<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
None.....		132	75	272	70	209	220	59	44	135
Green manure.....	200	182	356	548	400	458	765	395	640	468
Lime, green manure.....	200	230	293	430	385	385	730	747	665	483
Lime.....	200	260	250	350	469	288	702	497	302	390
Green manure.....	300	222	419	622	780	610	952	755	1,000	670
Lime, green manure.....	300	392	313	449	735	455	1,045	827	735	619
Lime.....	300	370	375	415	592	415	880	737	435	527
Green manure.....	400	305	731	610	800	692	1,185	662	957	743
Lime, green manure.....	400	450	400	478	745	585	1,260	812	720	681
Lime.....	400	428	487	485	729	505	952	866	590	630

<sup>1</sup> Yields for 1930 and 1931 not available.

Davis, W. J. Cotton Production \* \* \* Ga. Coastal Plain Agr. Expt. Sta. Bull. 13, 29 pp., illus. 1930. See p. 23.

Davis, W. J. Corn Production \* \* \* Ga. Coastal Plain Agr. Expt. Sta. Bull. 14, 15 pp., illus. 1930. See p. 12.

Stephens, J. L., agent, Bur. Plant Indus., U. S. Dept. Agr., Ga. Coastal Plain Expt. Sta., Tifton, Ga. Through correspondence of July 22, 1936.

## EFFECTS OF LIMING ON THE YIELDS OF CORN IN—

### GEORGIA

**Conducted by:** Georgia Coastal Plain Experiment Station.

**Conducted at:** Tifton.

**Period:** 1921-31.

**Purpose:** To determine the value of lime and green manure with varying amounts of fertilizer in a 3-year rotation of cotton, corn, and oats. (Cotton yield given in table 31; oats in table 33.)

**Procedure and conditions:** Previous to 1926 a cover crop of cowpeas was turned under following oats in the rotation. From 1926 through 1931 a winter green manure crop of Austrian winter peas was grown in addition to the cowpea cover crop.

Whatley's Prolific corn and Petty's Toole cotton were used. Fulghum variety of oats was used from 1922 through 1928. The variety was changed to Hundred Bushel in 1929.

One and one-half tons of ground limestone were applied every 3 years to the limed plots.

An 8-2-6 (phosphoric acid, ammonia, and potash) fertilizer was applied at the time of planting cotton and corn in amounts varying from 200 to 400 pounds per acre.

**Results:** For corn given in table 32.

TABLE 32.—*Effect of lime and green manure on the yield of corn in a 3-year rotation, Tifton, Ga., 1922-29*

Treatment	Fertilizer per acre	Yield of corn per acre <sup>1</sup>									
		1922	1923	1924	1925	1926	1927	1928	1929	8-year aver- age	
None.....		Bu. 26.3	Bu. 7.7	Bu. 20.0	Bu. 28.9	Bu. 12.8	Bu. 5.8	Bu. 13.2	Bu. 8.7	Bu. 15.4	
Green manure.....	200	42.6	27.9	35.9	34.2	26.2	26.3	27.4	33.7	31.8	
Lime, green manure.....	200	35.2	29.5	28.7	30.0	32.7	17.9	24.9	34.8	29.2	
Lime.....	200	23.4	25.3	26.9	33.5	23.8	9.4	19.4	32.1	24.2	
Green manure.....	300	40.9	32.0	38.7	38.4	28.6	26.9	29.1	45.5	35.0	
Lime, green manure.....	300	36.4	33.3	33.0	40.6	37.8	20.0	30.3	51.6	35.4	
Lime.....	300	33.8	26.1	27.3	33.3	27.5	10.2	14.4	44.5	27.1	
Green manure.....	400	34.4	40.2	40.0	45.1	35.8	33.3	31.9	58.6	39.9	
Lime, green manure.....	400	37.0	36.9	35.2	41.6	37.2	21.2	34.5	51.6	36.9	
Lime.....	400	37.5	32.2	24.8	35.0	28.2	13.4	14.3	39.5	28.1	

<sup>1</sup> Yields for 1930 and 1931 not available.

Davis, W. J. Cotton Production \* \* \* Ga. Coastal Plain Agr. Expt. Sta. Bull. 13, 29 pp., illus. 1930. See p. 23.

Davis, W. J. Corn Production \* \* \* Ga. Coastal Plain Agr. Expt. Sta. Bull. 14, 15 pp., illus. 1930. See p. 12.

Stephens, J. L., agent, Bur. Plant Indus., U. S. Dept. Agr., Ga. Coastal Plain Expt. Sta., Tifton, Ga. Through correspondence of July 22, 1936.

## EFFECTS OF LIMING ON THE YIELDS OF OATS IN— GEORGIA

**Conducted by:** Georgia Coastal Plain Experiment Station.

**Conducted at:** Tifton.

**Period:** 1921-31.

**Purpose:** To determine the value of lime and green manure with varying amounts of fertilizer in a 3-year rotation of cotton, corn, and oats. (Cotton yields given in table 31; corn in table 32.)

**Procedure and conditions:** Previous to 1926 a cover crop of cowpeas was turned under following oats in the rotation. From 1926 through 1931 a winter green manure crop of Austrian winter peas was grown in addition to the cowpea cover crop.

Whatley's Prolific corn and Petty's Toole cotton were used. Fulghum variety of oats was used from 1922 through 1928. The variety was changed to Hundred Bushel in 1929.

One and one-half tons of ground limestone were applied every 3 years to the limed plots.

An 8-2-6 (phosphoric acid, ammonia, and potash) fertilizer was applied at the time of planting cotton and corn in amounts varying from 200 to 400 pounds per acre.

**Results:** For oats given in table 33.

TABLE 33.—*Effect of lime and green manure on the yield of oats in a 3-year rotation, Tifton, Ga., 1922-31*

Treatment	Fertilizer per acre	Yield of oats per acre <sup>1</sup>								
		1922	1925	1926	1927	1928	1929	1930	1931	8-year average
		<i>Bu.</i>	<i>Bu.</i>	<i>Bu.</i>	<i>Bu.</i>	<i>Bu.</i>	<i>Bu.</i>	<i>Bu.</i>	<i>Bu.</i>	<i>Bu.</i>
None.....		-----	0.7	18.1	13.3	2.5	12.9	15.0	11.3	<sup>2</sup> 10.5
Green manure.....	200	21.3	9.2	33.1	19.0	14.2	25.4	25.3	38.8	23.2
Lime, green manure.....	200	19.7	15.0	33.8	29.4	11.1	30.5	41.3	51.3	29.0
Lime.....	200	22.2	20.6	24.1	23.4	11.7	21.8	39.4	30.9	24.2
Green manure.....	300	22.0	11.3	40.0	30.0	14.8	33.7	29.4	55.9	29.6
Lime, green manure.....	300	21.0	19.1	35.7	27.5	11.6	32.5	27.2	40.6	26.9
Lime.....	300	18.4	19.9	34.7	25.9	15.3	24.2	37.5	20.3	24.5
Green manure.....	400	17.1	15.3	40.9	32.8	15.5	35.6	32.3	53.8	30.4
Lime, green manure.....	400	21.1	22.6	33.4	30.9	15.4	34.3	36.3	48.1	30.2
Lime.....	400	20.2	19.3	27.8	29.0	14.6	19.9	40.9	22.5	24.2

<sup>1</sup> Yields for 1923 and 1924 not available.<sup>2</sup> 7-year average.

Davis, W. J. Cotton Production \* \* \* Ga. Coastal Plain Agr. Expt. Sta. Bull. 13, 29 pp., illus. 1930. See p. 23.

Davis, W. J. Corn Production \* \* \* Ga. Coastal Plain Agr. Expt. Sta. Bull. 14, 15 pp., illus. 1930. See p. 12.

Stephens, J. L., agent, Bur. Plant Indus., U. S. Dept. Agr., Tifton, Ga. Ga. Coastal Plain Agr. Expt. Sta. Through correspondence of July 22, 1936.

## EFFECTS OF LIMING ON THE YIELDS OF WHEAT, CORN, AND CLOVER HAY IN—

## TENNESSEE

**Conducted by:** Tennessee Agricultural Experiment Station.**Conducted at:** Knoxville.**Period:** 1905-25.**Purpose:** To determine the effect of liming on the yields per acre in a 5-year rotation of corn, soybeans, wheat, and clover and grass.**Soil:** The soil was a Cumberland loam. The surface soil was brownish-colored, 8 to 10 inches deep, and of excellent texture. It was underlaid by a rather heavy dark-red subsoil extending to a depth of about 20 feet or more. Degree of slope was 3 percent.**Procedure and conditions:** There were 15 plots which received various fertilizer treatments, but the results of only 5 plots which were manured are given here. Each plot was one-fortieth of an acre in size.

Corn was planted in rows 3 feet in width.

Seedings were made of crimson clover as a cover crop after corn. The crimson clover crops grown after corn were turned under, but all other crops of the rotation were removed. The alsike or red clover and grass crops stood for 2 years after seeding. The first year's crop was chiefly clover while the second year's crop was chiefly grass. The first crop of clover was alsike but red clover was grown thereafter.

Manure was applied to the corn and wheat crops only at the rate of 9½ tons per acre. Half of each plot was limed in 1905 at the rate of 1,800 pounds per acre, and the same half again in 1919 at the rate of 1 ton per acre.



**Miscellaneous:** Some results of summer crops are given in this table.

**Results:** Results, showing the average yields of the five manured plots, are given in table 34.

TABLE 34.—*Effects of liming in a 5-year rotation of corn, soybeans, wheat, clover, and grass, Knoxville, Tenn., 1905-25*

CLOVER, GRASS, HAY, AND WHEAT YIELDS

Year	Crop	Yield per acre		Year	Crop	Yield per acre	
		Limed	Unlimed			Limed	Unlimed
		Tons	Tons			Bushels	Bushels
1907	Alsike clover	2.10	0.62	1911	Wheat	26.9	25.0
1908	Grass	3.18	2.13	1916	do	21.9	22.0
1910	Crimson clover	1.66	1.34	1921	do	29.0	24.6
1912	Red clover	1.66	1.17				
1913	Grass	.62	.49				
1915	Crimson clover	.65	.52				
1917	Red clover	1.10	.74				
1918	Grass	.85	.64				
1922	Red clover	2.48	.99				
1923	Grass	.73	.41				
	Average	1.50	.91		Average	25.9	23.9

SOYBEAN HAY AND CORN YIELD

Year	Crop	Yield per acre		Year	Crop	Yield per acre	
		Tons	Tons			Bushels	Bushels
1910	Soybeans	2.51	2.52	1909	Corn	73.5	61.4
1915	do	2.08	2.03	1914	do	48.8	49.1
1920	do	2.74	2.28	1919	do	51.4	48.8
1925	do	.85	.72	1924	do	40.3	39.5
	Average	2.05	1.89		Average	53.5	49.7

Moore, C. A. Effects of Liming and Green Manuring on Crop Yields and on Soil Supplies of Nitrogen and Humus. Tenn. Agr. Expt. Sta. Bull. 135, 64 pp., illus. 1926. See pp. 5, 43, 44.

### III.—TESTED PRACTICES FOR GROWING WINTER SOIL-CONSERVING CROPS

#### EFFECTS OF INOCULATING WINTER LEGUMES ON THEIR YIELDS IN—

##### ALABAMA

##### EXPERIMENT A

**Conducted by:** Alabama Agricultural Experiment Station.

**Conducted at:** Auburn.

**Period:** 1896-97.

**Purpose:** To determine the effects of inoculating hairy vetch seed on the hairy vetch yields.

**Land history:** The land had been in Kafir corn (for forage) in 1896 and in oats in 1895. It had been in cotton and corn chiefly, for several decades. As far as could be learned this field had never borne any leguminous crop other than cowpeas and no cowpeas since 1894.

**Soil:** According to the author the soil was a poor upland "mongrel of Norfolk and Cecil." The land had a medium to slight slope and was slightly eroded.

**Procedure and conditions:** There were 4 plots, each one-twelfth of an acre in size, and there were 2 replications. All plots were plowed and harrowed uniformly.

Hairy vetch was sown broadcast on October 17, 1896, on all the plots at the rate of 30 quarts per acre, then covered with a smoothing harrow and roller. The seed sown on plots 1 and 3 received no treatment. Seed sown on plots 2 and 4 was treated, before sowing, by dipping into water into which there had been stirred and allowed to settle earth from a lawn (once a garden spot) on which narrow-leaved vetch<sup>1</sup> (*Vicia angustifolia*) had for several years in succession made a thriving growth. After being moistened in this solution, the seed was sown and immediately covered. (At the time of taking the earth for inoculation purposes the young common vetch plants were about 2 inches high and already had tubercles on their roots.)

The inoculated plants at the time of cutting formed a mass about 15 inches thick and most of the branches were about 3 feet long. On plot 1 there were few branches over 8 inches long.

On May 20, 1897, the growth on all plots was cut. A scythe was used on the inoculated plots, but on plot 1 (untreated) plants were so small they had to be cut with a sickle and gathered one by one.

Green weights were taken May 10, immediately after cutting, and dry weights were taken June 21 after the material had been thoroughly cured and stored 1 month as hay.

Fertilizer was applied at the rate of 400 pounds of acid phosphate and 120 pounds of sulphate of potash per acre. No nitrogen was applied.

**Miscellaneous:** Yields of plots 1 and 2, only, are reported here, because they alone are comparable. Plot 3 was so situated that a thin sheet of surface water from plot 4 flowed over it and carried sufficient germs from the treated plot to inoculate about half the plants on plot 3. These accidentally inoculated plots had branches 3 feet long and an abundance of tubercles. The actual yields of thoroughly cured hay were 1,036 pounds per acre with partial inoculation (plot 3), and 2,184 with careful inoculation of the seed before planting (plot 4).

**Results:** Given in table 35.

TABLE 35.—Yield per acre of hairy vetch from inoculated and noninoculated seed  
Auburn, Ala., 1897

Treatment	Yield per acre	
	Green forage	Cured hay
Noninoculated (plot 1).....	Pounds 900	Pounds 232
Inoculated (plot 2).....	9,136	2,540

Duggar, J. F. Soil Inoculation for Leguminous Plants. Ala. Agr. Expt. Sta. Bull. 87, 488 pp., illus. 1897. See pp. 464-467.

Tidmore, J. W., head, Dept. of Agron. and Soils, Ala. Poly. Inst., Auburn, Ala. Through correspondence of July 25, 1936.

<sup>1</sup> Duggar, J. F. Author's change in manuscript, 1936. As stated in Bulletin 87, this was common vetch (*Vicia sativa*).

## EXPERIMENT B

**Conducted by:** Alabama Agricultural Experiment Station.

**Conducted at:** Auburn.

**Period:** 1902-3.

**Purpose:** To determine the effect of inoculation on the yield of crimson clover and increased fertilizing effect of crimson clover on yields of subsequent crops of sorghum, corn, etc. Only crimson clover yields are given here.

**Soil:** Reddish sandy loam (Cecil series).

**Procedure and conditions:** The experiment was conducted on land on which a moderate dressing of stable manure had been used on the preceding grain crop.

The inoculating material was soil from an older crimson clover field, applied broadcast at the rate of at least 1 ton per acre at the time of sowing the seed.

The plants on the noninoculated plots grew from 2 to 4 inches high and they were so few that they could not be cut with a scythe or sickle.

**Results:** Given in table 36.

TABLE 36.—*Effects of inoculation on the yield of crimson clover, Auburn, Ala., 1903*

Treatment	Yield of crimson clover per acre
	<i>Pounds</i>
Noninoculated.....	0
Inoculated.....	6,100

Duggar, J. F. Crimson Clover. Ala. Agr. Expt. Sta. Bull. 147, pp. 105-129, illus. 1909. See pp. 112, 113.

## EXPERIMENT C

**Conducted by:** Alabama Agricultural Experiment Station.

**Conducted at:** Auburn.

**Period:** 1897-98.

**Purpose:** To determine the effect of inoculating hairy vetch with vetch "Nitragin" on the yield of hairy vetch.

**Land history:** The land had been in cotton and corn, chiefly, for several decades.

**Soil:** According to the author the soil was a "mongrel Norfolk and Cecil." The land had a medium to slight slope, and was slightly eroded.

**Procedure and conditions:** There were four plots of one-twelfth acre in size. Two replications were used. The land was plowed and harrowed, and on November 4, 1897, it was sown broadcast to hairy vetch at the rate of 30 quarts per acre. Two plots were sown to seed which had been inoculated by dipping into a solution of vetch "Nitragin", and the other two were sown to untreated seed. On May 9, 1898, vetch was cut for hay. On the inoculated plots large clusters of tubercles were found on the roots of the plants, while on the plants grown from untreated seed tubercles were absent.

Acid phosphate and sulphate of potash were applied to vetch. Records of the exact amount of applications were lost through fire.

**Results:** Given in table 37.

TABLE 37.—Yield of hairy vetch per acre from inoculated and noninoculated seed, Auburn, Ala., 1898

Treatment	Yield of hairy vetch per acre	
	Green forage	Cured hay
Noninoculated <sup>1</sup> .....	<i>Pounds</i> 1,560	<i>Pounds</i> 564
Inoculated.....	8,460	3,180
Do.....	11,520	3,360
Average of inoculated plots.....	9,990	3,270

<sup>1</sup> Only 1 noninoculated plot cut for hay, the other was turned under as part of another experiment.

Duggar, J. F. Experiments with Crimson Clover and Hairy Vetch. Ala. Agr. Expt. Sta. Bull. 96, pp. 183-208, illus. 1898. See pp. 193-195.

Tidmore, J. W., head, Dept. of Agron. and Soils, Ala. Poly. Inst., Auburn, Ala. Through correspondence of July 25, 1936.

## EXPERIMENT D

**Conducted by:** Alabama Agricultural Experiment Station.

**Conducted at:** Auburn.

**Period:** 1897-98.

**Purpose:** To determine the effect of inoculating crimson clover with clover culture, "Nitragin", on the crimson clover yield.

**Land history:** There is no evidence of clover ever having been grown in this or adjoining fields.

**Soil:** According to the author the soil was a "mongrel Norfolk and Cecil." The land had a medium slope and was slightly eroded. It was of low fertility and was capable of producing only 10 to 15 bushels of corn unfertilized.

**Procedure and conditions:** There were 4 plots, each one-twentieth acre in size. There were two replications. All the plots were located on the same terrace, and all were uniformly prepared at the same time by shallow plowing and harrowing.

Seed was sown broadcast at the rate of 10 quarts per acre. Because of dry weather it was not sown until November 5, 1897.

Seed for plots 1 and 3 was inoculated by moistening with water to which had been added two teaspoonfuls of clover culture "Nitragin." Seed for plots 2 and 4 was not treated. As soon as the seed had been sown a harrow was run over all plots to cover the seed. Hay was cut about May 10, 1898.

Plots were fertilized on November 5, 1897, at the rate of 300 pounds of 14 percent acid phosphate and 40 pounds of 50 percent muriate of potash per acre. Fertilizers were broadcast and harrowed in. No nitrogenous fertilizer was used.

**Results:** Given in table 38.



TABLE 38.—*Yields of crimson clover from inoculated and noninoculated seed, Auburn, Ala., 1898*

Treatment	Yield of crimson clover per acre	
	Green forage	Cured hay
	Pounds	Pounds
Noninoculated.....	1,277	464
Do.....	3,310	1,059
Average.....	2,293	761
Inoculated.....	16,746	4,781
Do.....	11,333	3,333
Average.....	14,039	4,057

Duggar, J. F. Experiments with Crimson Clover and Hairy Vetch. Ala. Agr. Expt. Sta. Bull. 96, pp. 183-208, illus. 1898. See pp. 189-191.

Tidmore, J. W., head, Dept. Agron. and Soils, Ala. Poly. Inst., Auburn, Ala. Through correspondence of July 25, 1936.

### EFFECTS OF DATES AND RATES OF SEEDING, AND DATES OF CUTTING ON THE YIELD OF WINTER SOIL-CONSERVING CROPS IN—

#### ALABAMA

**Conducted by:** Alabama Agricultural Experiment Station.

**Conducted at:** Auburn.

**Period:** 1926-29.

**Purpose:** To determine the effect of date and rate of seeding certain winter legumes on the yields.

**Land history:** Not known.

**Soil:** Norfolk sandy loam. The land did not slope nor was it noticeably eroded.

**Procedure and conditions:** The land was plowed, and leveled with a drag. Hairy vetch, monantha vetch, and Austrian winter peas were seeded at various rates. The same land was used continuously.

Crops were harvested between March 19 and May 1.

Six hundred pounds of 16 percent basic slag per acre were applied in the drill with the seed at time of planting.

**Results:** Given in table 39.

TABLE 39.—*Effects of dates and rates of seeding on the green weight yields of specified legumes, Auburn, Ala., 1927-29*

Date of seeding	Rate of seeding and 3-year average yield per acre 1927-29					
	Hairy vetch		Monantha vetch		Austrian winter peas	
	Rate	Yield	Rate	Yield	Rate	Yield
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Sept. 30.....	10	1,027	10	8,393	30	7,412
	20	1,577	20	9,240	45	8,138
	30	2,228	30	9,211	60	8,653
	10	791	10	5,308	30	4,747
Oct. 26.....	20	1,682	20	6,949	45	5,668
	30	1,893	30	7,700	60	4,931
	10	354	10	1,442	30	2,313
Nov. 23.....	20	676	20	2,000	45	3,322
	30	918	30	2,930	60	3,669
Dec. 19.....			10	594	30	835
			20	947	45	1,393
			30	1,312	60	1,562

Bailey, R. Y., Williamson, J. T., Duggar, J. F. Experiments With Legumes in Alabama. Ala. Agr. Expt. Sta. Bull. 232, 44 pp., illus. 1930. See p. 29.

Tidmore, J. W., head, Dept. of Agron. and Soils, Ala. Poly. Inst., Auburn, Ala. Through correspondence of July 25, 1936.

## GEORGIA

## EXPERIMENT A

**Conducted by:** Georgia Coastal Plain Experiment Station in cooperation with the United States Department of Agriculture.

**Conducted at:** Tifton.

**Period:** 1930-33.

**Purpose:** To determine the effects of different rates of seeding winter cover crop mixtures and dates of cutting on the green and dry weight yields.

**Land history:** Before this experiment was started the land was in rotated field crops.

**Soil:** The soil was Tifton sandy loam. There was a gentle slope to the land and there was very little erosion.

**Procedure and conditions:** There were two replications of the plots, each plot being one-twentieth of an acre in size. The winter cover crops were on different land each year.

The seed bed was prepared by turning and harrowing. Seed was sown from October 15 to 25 with a grain drill. All the seed was inoculated with commercial inoculating cultures.

No fertilizer was applied.

**Results:** Given in table 40.

TABLE 40.—*Effects of different rates of seeding winter cover crop mixtures and dates of cutting on the green and dry weight yields, Tifton, Ga., 1931-33*

Crops and rates of seeding per acre	3-year average yield per acre of green and dry weight, 1930-33			
	Green weight		Dry weight <sup>1</sup>	
	Cut Mar. 15	Cut Apr. 1	Cut Mar. 15	Cut Apr. 1
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Monantha vetch, 35 pounds.....	8, 987	15, 613	1, 717	2, 538
Hairy vetch, 30 pounds.....	8, 133	15, 506	1, 914	3, 221
Monantha vetch, 35 pounds; smooth vetch, 30 pounds.....	9, 640	14, 120	1, 999	2, 634
Hairy vetch, 25 pounds; monantha vetch, 30 pounds.....	10, 606	13, 960	2, 207	2, 569
Austrian winter peas, 35 pounds; hairy vetch, 25 pounds.....	9, 119	13, 100	2, 114	2, 631
Hairy vetch, 25 pounds; smooth vetch, 25 pounds.....	9, 023	12, 793	2, 243	2, 625
Austrian winter peas, 45 pounds; hairy vetch, 30 pounds.....	8, 260	12, 194	1, 804	2, 478
Smooth vetch, 30 pounds.....	7, 980	12, 067	1, 549	2, 075
Austrian winter peas, 45 pounds; smooth vetch, 30 pounds.....	7, 400	11, 593	1, 829	2, 511
Monantha vetch, 35 pounds; monantha vetch, 35 pounds.....	8, 233	11, 173	1, 636	2, 339
Austrian winter peas, 35 pounds; smooth vetch, 25 pounds.....	8, 233	10, 893	1, 559	1, 931
Austrian winter peas, 45 pounds; monantha vetch, 35 pounds; oats, 4 pecks.....	7, 126	10, 840	1, 557	2, 263
Smooth vetch, 30 pounds; oats, 6 pecks.....	5, 630	8, 886	1, 624	2, 339
Hairy vetch, 30 pounds; oats, 6 pecks.....	5, 480	8, 853	1, 838	2, 544
Monantha vetch, 35 pounds; oats, 6 pecks.....	4, 793	8, 260	1, 550	2, 163
Austrian winter peas, 45 pounds; oats, 6 pecks.....	5, 140	7, 406	1, 505	1, 942
Fulghum oats, 4 pecks.....	4, 700	6, 554	1, 412	1, 835
Fulghum oats, 6 pecks.....	4, 106	5, 993	1, 418	1, 832
Austrian winter peas, 45 pounds.....	4, 266	5, 747	1, 384	1, 841
	3, 989	4, 759	937	998

<sup>1</sup> Air-dried.

<sup>2</sup> Average as stated in bulletin was 12,133.

Stephens, J. L. Winter Legume Cover Crops. Ga. Coastal Plain Expt. Sta. Bull. 23, 44 pp., illus. 1934. See pp. 5, 25-30.

Stephens, J. L., agent, Bur. Plant Indus., U. S. Dept. Agr., Ga. Coastal Plain Expt. Sta., Tifton, Ga. Through correspondence of July 22, 1936.

## EXPERIMENT B

**Conducted by:** Georgia Coastal Plain Experiment Station in co-operation with the United States Department of Agriculture.

**Conducted at:** Tifton.

**Period:** 1927-33.

**Purpose:** To determine the best date of seeding and of cutting specified winter legumes.

**Soil:** Tifton sandy loam. There was a gentle slope to the land and there was very little erosion.

**Land history:** Before the experiment was started the land was in a rotation of field crops.

**Procedure and conditions:** There were two replications of the plots, each plot being one-twentieth of an acre in size. The winter cover crops were on different land each year.

The first seeding of the cover crops was made in the fall of 1927.

All seed was inoculated with commercial inoculating cultures.

The seed bed was prepared by turning and harrowing.

Seedings were made with a grain drill at 15-day intervals beginning October 1 and continuing through December 1. Rates of seeding per acre were as follows: Austrian winter peas, 45 pounds; monantha vetch, 35 pounds; hairy and smooth vetch, 30 pounds.

Cuttings were made March 15 and April 1.

No fertilizer was applied.

**Results:** Given in table 41.

TABLE 41.—*Effects of different dates of seeding and of cutting on the green and on the dry weight yields of Austrian winter peas and vetches, Tifton, Ga., 1928-33*

Date of seeding	Average yield per acre							
	Green weight <sup>1</sup>				Dry weight <sup>2</sup>			
	Austrian peas	Vetches			Austrian peas	Vetches		
		Hairy	Monan- tha	Smooth <sup>3</sup>		Hairy	Monan- tha	Smooth
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Oct. 1.....	* 7,438	* 9,812	* 11,072	9,900	934	2,127	1,632	1,719
Oct. 15.....	6,750	7,966	9,963	8,595	1,059	1,353	1,299	1,251
Nov. 1.....	4,293	3,660	7,480	5,470	548	831	1,070	924
Nov. 15.....	1,787	2,038	3,217	2,535	212	415	472	466
Dec. 1.....	726	947	890	745	112	272	136	176

CUT APR. 1								
Oct. 1.....	* 8,472	* 15,112	* 13,404	11,720	1,100	2,772	2,336	1,905
Oct. 15.....	7,876	12,016	11,940	11,205	862	2,214	2,040	1,815
Nov. 1.....	5,687	6,636	12,070	8,025	672	1,279	2,127	1,308
Nov. 15.....	3,060	3,936	7,496	3,870	338	924	1,385	805
Dec. 1.....	1,487	2,107	3,573	1,665	192	552	570	423

<sup>1</sup> 6-year average, 1928-33, except as noted in footnotes 3 and 4.

<sup>2</sup> 3-year average, 1931-33 (air dried).

<sup>3</sup> 4-year average, 1930-33.

<sup>4</sup> Averages are for 5 years only.

Stephens, J. L. Winter Legume Cover Crops \* \* \* Ga. Coastal Plain Expt. Sta. Bull. 23, 44 pp., illus. 1934. See pp. 5, 10-14.

Stephens, J. L., agent, Bur. Plant Indus., U. S. Dept. Agr., Ga. Coastal Plain Expt. Sta., Tifton, Ga. Through correspondence of July 22, 1936.

## EXPERIMENT C

**Conducted by:** Georgia Coastal Plain Experiment Station in cooperation with the United States Department of Agriculture.

**Conducted at:** Tifton.

**Period:** 1927-33.

**Purpose:** To determine the best rate of seeding specified winter legumes.

**Land history:** The experiment was conducted on an old piece of land which had been in field crops for, possibly, 20 years.

**Soil:** The soil was a Tifton sandy loam. There was a gentle slope to the land and very little erosion.

**Procedure and conditions:** All seed was inoculated with commercial inoculating cultures. The same land was not used continuously. There were two replications of plots, each plot being one-twentieth of an acre in size.

The seed bed was prepared by turning and harrowing. Seedings were made by hand in 12-inch rows and covered with a spike-tooth harrow.

The date of planting was around October 15 to 25. Cuttings were made on March 15 and April 1.

No fertilizer was applied.

**Results:** Given in table 42.

TABLE 42.—*Effects of rates of seeding on the green and dry weight yields of specified winter legumes, Tifton, Ga., 1928-33*

CUT MAR. 15

Austrian peas			Vetches								
Acre rate of seeding <sup>1</sup>	Green weight <sup>2</sup>	Dry weight <sup>3</sup>	Hairy			Monantha			Smooth		
			Acre rate of seeding	Average yield per acre		Acre rate of seeding	Average yield per acre		Acre rate of seeding	Average yield per acre	
				Green weight <sup>4</sup>	Dry weight <sup>3</sup>		Green weight <sup>4</sup>	Dry weight <sup>3</sup>		Green weight <sup>4</sup>	Dry weight <sup>3</sup>
Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
20	4, 242	1, 095	15	5, 230	1, 438	20	6, 024	1, 339	15	6, 205	1, 348
30	5, 192	1, 225	20	5, 107	1, 331	25	6, 240	1, 382	20	6, 840	1, 533
40	5, 426	1, 367	25	5, 052	1, 446	30	6, 355	1, 510	25	7, 545	1, 672
50	5, 418	1, 242	30	5, 221	1, 525	35	6, 553	1, 429	30	7, 385	1, 710
60	5, 748	1, 374	35	6, 186	1, 716	40	6, 977	1, 602	35	7, 265	1, 678

CUT APR. 1

20	5, 303	1, 126	15	5, 913	1, 624	20	7, 733	1, 599	15	7, 590	1, 650
30	6, 350	1, 384	20	6, 136	1, 643	25	7, 590	1, 696	20	7, 845	1, 689
40	6, 356	1, 495	25	6, 100	1, 788	30	8, 100	1, 953	25	9, 570	2, 004
50	6, 207	1, 806	30	6, 700	1, 896	35	8, 080	1, 727	30	9, 190	2, 008
60	6, 496	1, 328	35	7, 240	2, 008	40	9, 393	1, 991	35	9, 735	2, 166

<sup>1</sup> Seeded Oct. 15-20.

<sup>2</sup> Green weight averages are for 6 years, 1928-33.

<sup>3</sup> Dry weight averages are for 3 years, 1931-33 (air-dried).

<sup>4</sup> Green weight averages of smooth vetch are for 4 years only, 1930-33.

Stephens, J. L. Winter Legume Cover Crops for the Coastal Plain of Georgia. Ga. Coastal Plain Exp. Sta. Bull. 23, 44 pp., illus. 1934. See pp. 5, 15-20.

Stephens, J. L., agent, Bur. Plant Indus., U. S. Dept. Agr., Ga. Coastal Plain Expt. Sta., Tifton, Ga. Through correspondence of July 22, 1936.



## EXPERIMENT D

**Conducted by:** Georgia Agricultural Experiment Station.

**Conducted at:** Experiment, Ga.

**Period:** 1929-30.

**Purpose:** To determine the effects of the rates of planting on the yields of Austrian winter peas and vetches.

**Soil:** Fairly fertile Cecil sandy clay loam.

**Procedure and conditions:** Plots were one one-hundredth of an acre in size. There were five replications. On October 14, 1929, the crops were planted broadcast at 10, 20, 30, and 40 pounds per acre, and covered with a disk harrow. Cuttings were made during April 1930, when the plants were blooming freely.

**Results:** Given in table 43.

TABLE 43.—*Effects of rates of seeding upon the yields of Austrian peas, crimson clover, and several vetches, Experiment, Ga., 1930*

Crop	Seeding rate per acre	Yield per acre	Crop	Seeding rate per acre	Yield per acre
		Air-dry matter			Air-dry matter
	Pounds	Pounds		Pounds	Pounds
Austrian peas.....	10	3,960	Monantha vetch.....	10	4,991
	20	5,229		20	5,968
	30	6,835		30	4,991
	40	8,405		40	6,402
Average.....		6,107	Average.....		5,588
Hairy vetch.....	10	7,196	Smooth vetch.....	10	4,568
	20	6,939		20	5,481
	30	7,547		30	5,786
	40	6,435		40	7,165
Average.....		7,029	Average.....		5,735
Hungarian vetch.....	10	3,330	Crimson clover (hulled seed).....	10	2,761
	20	3,173		20	3,514
	30	3,555		30	4,016
	40	4,904		40	4,016
Average.....		3,740	Average.....		3,577

Hale, G. A. Winter Legume Experiments with Cultural Recommendations. Table 10. Through correspondence of Apr. 13, 1936, with H. P. Stuckey, Dir., Agr. Expt. Sta., Experiment, Ga.  
Bledsoe, R. P., Agron., Ga. Agr. Expt. Sta. Through correspondence of July 27, 1936.

## EXPERIMENT E

**Conducted by:** Georgia Agricultural Experiment Station.

**Conducted at:** Experiment, Ga.

**Period:** 1925-26.

**Purpose:** To determine the effects of dates of cutting on the yield of crimson clover hay.

**Land history:** The land had been planted in alfalfa 7 years before, when it was heavily fertilized with commercial fertilizers, barnyard manure, and lime. Two years before this experiment was started, the field was plowed up and planted to corn 1 year, cotton the next year.

**Procedure and conditions:** Crimson clover was seeded about October 1 at the rate of 50 pounds of unhulled seed per acre.

**Results:** Given in table 44.

TABLE 44.—*Effects of dates of harvesting crimson clover on the yield of crimson clover hay, Experiment, Ga., 1926*

Date of harvesting	Stage of growth	Yield of hay per acre	
		Green matter	Dry matter
		<i>Pounds</i>	<i>Pounds</i>
Mar. 26.....	No blooms.....	29,900	3,714
Apr. 2.....	do.....	30,650	4,279
Apr. 9.....	Few blooms.....	49,300	5,196
Apr. 16.....	One-fourth bloom.....	70,200	6,072
Apr. 23.....	One-half bloom.....	73,200	7,371
Apr. 30.....	Full bloom.....	45,400	6,578

Bledsoe, R. P. A Preliminary Report on the Value of Hairy Vetch and \* \* \* Ga. Agr. Expt. Sta. Bull. 146, pp. 189-208. 1927. See pp. 194, 195.

## EXPERIMENT F

**Conducted by:** Georgia Agricultural Experiment Station.

**Conducted at:** Experiment, Ga.

**Period:** 1930-31.

**Purpose:** To determine the effect of the date of seeding specified winter cover crops on the yields when grown alone and in legume-grain mixtures.

**Soil:** Cecil sandy clay loam.

**Procedure and conditions:** Plots were one one-hundredth acre in size. There were five replications. Seed was sown at the rate of 30 pounds per acre. In the mixtures the legume and the grain were each sown at 30 pounds per acre. The seed was broadcast and disked into the soil.

Cuttings were made in April 1931.

**Results:** Given in table 45.

TABLE 45.—*Effects of dates of seeding on the yields of winter legumes grown alone and in legume-grain mixtures, Experiment, Ga., 1931*

Crop	Date of planting	Yield of air-dry matter per acre	Crop	Date of planting	Yield of air-dry matter per acre
		<i>Pounds</i>			<i>Pounds</i>
Austrian peas.....	{September 30.....	2,188	Austrian peas and Red Rustproof oats.....	{October 23.....	1,649
	{October 23.....	833		{November 23.....	621
	{November 23.....	447			
Average.....		1,156	Average.....		1,135
Hairy vetch.....	{September 30.....	2,918	Hairy vetch and Abruzzi rye.....	{October 23.....	2,427
	{October 23.....	1,226		{November 23.....	1,776
	{November 23.....	429			
Average.....		1,524	Average.....		2,102
Crimson clover.....	{September 30.....	968			
	{October 23.....	156			
	{November 23 <sup>1</sup> .....	0			
Average.....		375			

<sup>1</sup> Winter-killed.

Hale, G. A. Winter Legume Experiments with Cultural Recommendations. Table 11. Through correspondence of Apr. 13, 1936, with H. F. Stuckey, Dir., Agr. Expt. Sta., Experiment, Ga.

## EXPERIMENT G

**Conducted by:** Georgia Agricultural Experiment Station.

**Conducted at:** Experiment, Ga.

**Period:** 1928-29.

**Purpose:** To determine the effects of the rate and date of seeding and of the date of cutting upon the yields of Austrian winter peas and several vetches.

**Soil:** Cecil sandy clay.

**Procedure and conditions:** There were five replications. Seed was sown broadcast and disked into the soil. Cuttings were made on March 20, March 30, April 10, and April 20.

**Miscellaneous:** Yields as presented are so arranged that the influence of the date and rate of seeding can be studied. All dates of cutting are combined.

**Results:** Given in table 46.

TABLE 46.—Yields of winter legumes as influenced by the time and the rate of seeding, Experiment, Ga., 1929

Planting date	Seed- ing rate per acre	Yield per acre <sup>1</sup>						
		Aus- trian peas	Vetches				Crim- son clover	Aver- age, all crops
			Hairy	Hun- garian	Mon- antha	An- gusta		
		<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Sept. 21-----	10	2,205	2,205	2,090	2,840	1,263	2,353	2,159
	20	2,120	2,365	2,905	3,438	1,318	3,195	2,557
	30	2,138	1,943	2,910	3,370	1,523	2,980	2,477
	40	2,873	2,718	3,358	3,535	1,285	3,505	2,879
Oct. 6-----	10	1,888	2,303	2,030	2,253	1,158	2,750	2,064
	20	2,353	2,235	2,870	2,770	1,905	2,998	2,522
	30	2,603	2,725	3,245	3,725	1,308	2,768	2,729
	40	3,000	2,108	3,373	3,385	1,255	2,938	2,676
Oct. 20-----	10	1,968	1,618	1,745	1,260	1,235	1,038	1,477
	20	2,483	2,200	2,098	2,993	1,350	1,560	2,114
	30	2,603	2,520	2,345	2,505	1,490	2,278	2,290
	40	2,788	2,880	2,615	2,640	1,580	1,988	2,415
Average-----		2,418	2,318	2,632	2,893	1,389	2,529	2,363

<sup>1</sup> Air-dried.

Hale, G. A. Winter Legume Experiments with Cultural Recommendations. Table 9. Through correspondence of Apr. 13, 1936, with H. P. Stuckey, Dir., Agr. Expt. Sta., Experiment, Ga.

## EXPERIMENT H

**Conducted by:** Georgia Agricultural Experiment Station.

**Conducted at:** Experiment, Ga.

**Period:** 1925-26.

**Purpose:** To determine the most effective rate of seeding vetch.

**Procedure and conditions:** Seedings were made at the rate of 20, 30, 40, 50, 60, and 70 pounds per acre. One series of the 40-pound rate was lost in harvesting, and it was necessary, therefore, to omit this rate.

All plots were harvested April 30.

**Results:** Given in table 47.

TABLE 47.—*Effects of various rates of seeding on the yield of vetch, Experiment, Ga. 1926*

Seeding rate per acre <sup>1</sup>	Yield of vetch per acre		Increase of dry matter due to addition of 10 pounds seed	Yield in pounds of dry matter for each pound of seed sown
	Green weight	Dry weight		
<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
20	7, 033	1, 459	---	73
30	9, 266	1, 833	374	61
50	11, 100	2, 234	200	45
60	11, 800	2, 457	223	41
70	12, 500	2, 546	89	36

<sup>1</sup> In pounds.

Bledsoe, R. P. A Preliminary Report on the Value of Hairy Vetch and \* \* \* Ga. Agr. Expt. Sta. Bull. 146, 208 pp. 1927. See pp. 196, 197.

## SOUTH CAROLINA

**Conducted by:** South Carolina Agricultural Experiment Station.**Conducted at:** Clemson.**Period:** 1928-29.**Purpose:** To determine when to plant and when to plow under Austrian winter field peas in order to secure the maximum amount of nitrogen. The table given below is concerned only with the yields of this crop.**Land history:** The land was in small grain crops for 20 years or more before the experiment was started. Alfalfa was grown from about 1917 to 1923 and was heavily fertilized and limed. After alfalfa was removed, 400 to 600 pounds of muriate of potash per acre were applied before the crops ceased to show potash hunger.**Soil:** Cecil sandy loam. There was a 3-percent slope to the land and very slight erosion.**Procedure and conditions:** Plots were in duplicate. The land was flat broken, disk harrowed, then harrowed with a spike-tooth harrow. Vetch was sown broadcast.

The variety of vetch seed used was one obtained from the Northwest.

There was no fertilizer used.

**Results:** Given in table 48.TABLE 48.—*Effects of dates of planting and dates of harvesting Austrian winter peas on the yield of dry matter, Clemson, S. C., 1929*

Date of planting	Yield of dry matter per acre, 1929		Date of planting	Yield of dry matter, per acre, 1929	
	Date of harvesting			Date of harvesting	
	Apr. 30	May 14		Apr. 30	May 14
	<i>Pounds</i>	<i>Pounds</i>		<i>Pounds</i>	<i>Pounds</i>
Oct. 1.....	5, 314		Nov. 5.....	3, 158	5, 118
Oct. 22.....	4, 007	5, 662	Dec. 5.....	1, 524	3, 775
Nov. 1.....	4, 029	4, 356			

<sup>1</sup> Cut Apr. 23.

Bule, T. S. Winter Cover Crop Experiments. S. C. Agr. Expt. Sta. Circ. 37, 14 pp., illus. 1929. See p. 9.



EFFECTS OF METHODS OF SEEDING ON THE YIELD OF WINTER  
SOIL-CONSERVING CROPS IN—

## ALABAMA

## EXPERIMENT A

**Conducted by:** Alabama Agricultural Experiment Station.

**Conducted at:** Auburn.

**Period:** 1926-29.

**Purpose:** To determine the value of mixtures of Austrian winter peas, hairy vetch, and monantha vetch with oats for hay, when the seed was broadcast and when drilled.

**Procedure and conditions:** Oats were seeded at the rate of 64 pounds; hairy and monantha vetch, 20 pounds; and Austrian winter peas, 60 pounds per acre.

Land was fertilized with 400 pounds of superphosphate and 50 pounds of muriate of potash per acre.

**Miscellaneous:** The crops were not planted in the fall of 1927.

**Results:** Given in table 49.

TABLE 49.—*Effects of methods of seeding winter cover crops on hay yields, Auburn, Ala., 1929, and a 2-year average yield*

Crop	Yield of hay per acre			
	1929		2-year average, 1927 and 1929 <sup>1</sup>	
	Drilled	Broad- cast	Drilled	Broad- cast
	Pounds	Pounds	Pounds	Pounds
Oats.....		1,156		1,043
Hairy vetch.....		2,150		1,516
Monantha vetch.....		2,112		1,578
Austrian peas.....		3,490		2,499
Oats, hairy vetch.....	2,870	2,294	2,055	1,883
Oats, monantha vetch.....	2,366	3,524	1,810	2,653
Oats, Austrian peas.....	4,000	3,030	3,237	2,613

<sup>1</sup> No yields for 1928.

Davis, P. O., Randolph, W. L., eds. Hay. The Digest, Ala. Poly. Inst., Ala. Ext. Serv., v. 7, no. 4, 28 pp., illus. 1930. See p. 12.  
Sturkie, D. G., Bailey, R. Y. Experiments with Hay Crops in Alabama. Ala. Agr. Expt. Sta. Circ. 58, 18 pp., illus. 1931. See pp. 4, 5.

## EXPERIMENT B

**Conducted by:** Alabama Agricultural Experiment Station.

**Conducted at:** Auburn.

**Period:** 1926-29.

**Purpose:** To determine the best method of seeding various winter legumes.

**Land history:** Not known.

**Soil:** Norfolk sandy loam.

**Procedure and conditions:** The same plots were used continuously. The land was turned and smoothed with a drag.

Vetch was sown both broadcast and drilled. When drilled, vetch was planted in 12-inch rows. Plantings were made September 30, October 26, November 23, and December 19.

Harvestings were made between March 20 and April 30.

Hairy and monantha vetch were seeded at the rate of 20 pounds and Austrian winter peas 45 pounds per acre. Six hundred pounds of 16 percent basic slag were applied at planting, either in the drill or broadcast with the seed.

**Results:** Given in table 50.

TABLE 50.—*Effects of methods of seeding specified winter legumes on their green weight, Auburn, Ala., 1927-29*

Date of planting	3-year average yield of green weight per acre, 1927-29					
	Hairy vetch <sup>1</sup>		Monantha vetch		Austrian winter peas	
	Broad-cast	Drilled	Broad-cast	Drilled	Broad-cast	Drilled
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Sept. 30-----	2,393	3,100	8,613	10,492	5,186	6,906
Oct. 26-----	1,109	1,966	5,428	5,912	3,455	5,061
Nov. 23-----	442	852	1,890	3,063	1,928	3,216
Dec. 19-----	113	210	347	903	651	1,283

<sup>1</sup> Anthracnose injured the 1928 and the 1929 crops.

Bailey, R. Y., Williamson, J. T., Dugger, J. F. Experiments with Legumes in Alabama. Ala. Agr. Expt. Sta. Bull. 232, 44 pp., illus. 1930. See pp. 27-29.

Tidmore, J. W., head, Dept. of Agron. and Soils, Ala. Poly. Inst., Auburn, Ala. Through correspondence of July 25, 1936.

## GEORGIA

**Conducted by:** Georgia Coastal Plain Experiment Station in cooperation with United States Department of Agriculture.

**Conducted at:** Tifton.

**Period:** 1928-33.

**Purpose:** To determine the best method of seeding specified winter legume cover crops.

**Land history:** Before the experiment was started the land was in a rotation of field crops.

**Soil:** Tifton sandy loam. There was a gentle slope to the land and there was very little erosion.

**Procedure and conditions:** There were two replications of plots, each plot being one-twentieth of an acre in size.

Austrian winter peas, monantha, smooth, and hairy vetches were grown each year on different land. The first seeding of the cover crops was made in the fall of 1928.

All seed was inoculated with commercial inoculating cultures

The land was prepared for seeding by turning and harrowing.

Austrian winter peas were seeded at the rate of 40 to 45 pounds; monantha vetch, 35 pounds; hairy and smooth vetch, 30 pounds per acre. Plantings were made from October 15 to 25.

Methods of seeding were as follows:

**Drilling:** The land was plowed and harrowed and seeded with a calibrated grain drill, with disks set to plant deep.

**Disking:** The land was turned during early fall; seed broadcast by hand and the land then double cut with a two-horse disk harrow.

**Plowing:** Seed was broadcast by hand and covered by turning the land with a one-horse turn plow.

**Harrowing:** The land was plowed, seed broadcast by hand on the fresh plowed land and covered by harrowing with a spike-tooth section harrow.

**Planting in 18-inch rows:** The land was plowed, laid off in 18-inch rows, seeded by hand, and covered with spike-tooth harrow.

No fertilizer was applied.

**Results:** Given in table 51.

TABLE 51.—*Effects of different methods of seeding and dates of cutting on the green and on the dry yields of Austrian winter peas and vetches, Tifton, Ga., 1929-33*

Method of seeding	Average yield per acre							
	Green weight <sup>1</sup>				Dry weight <sup>2</sup>			
	Vetches				Vetches			
	Aus- trian peas	Hairy	Monan- tha	Smooth	Aus- trian peas	Hairy	Monan- tha	Smooth
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Drilled in.....	3,880	6,168	8,500	7,020	821	1,618	1,831	1,677
Disked in.....	4,064	5,152	6,197	6,206	881	1,480	1,295	1,387
Plowed in.....	5,496	5,644	7,432	6,993	1,113	1,597	1,568	1,695
Harrowed in.....	3,684	4,136	5,228	4,899	759	1,384	1,126	1,214
18-inch rows.....	4,316	5,156	5,760	4,180	865	1,399	1,355	959

CUT APR. 1								
Drilled in.....	3,680	7,967	9,524	9,554	725	2,202	2,203	2,072
Disked in.....	3,888	6,888	7,876	8,293	820	2,034	1,707	1,863
Plowed in.....	5,155	8,092	9,428	9,420	1,053	2,359	2,131	2,066
Harrowed in.....	4,464	5,556	6,492	7,140	898	1,624	1,560	1,599
18-inch rows.....	5,056	6,476	7,844	6,220	901	1,798	1,802	1,391

<sup>1</sup> 5-year average, 1929-33, except smooth vetch which is a 3-year average, 1931-33.

<sup>2</sup> 3-year average, 1931-33 (air-dried).

Stephens, J. L. Winter Legume Cover Crops \* \* \* Ga. Coastal Plain Expt. Sta. Bull. 23, 44 pp., illus. 1934. See pp. 5, 21-25.

Stephens, J. L., agent, Bur. Plant Indus., U. S. Dept. Agr., Ga. Coastal Plain Exp. Sta., Tifton, Ga. Through correspondence of July 22, 1936.

## EFFECTS OF FERTILIZING ON THE YIELD OF WINTER SOIL-CONSERVING CROPS IN

### ALABAMA

**Conducted by:** Alabama Agricultural Experiment Station, Auburn.

**Conducted at:** Andalusia, Hackleburg, Prattville, and Sylacauga.

**Period:** 1927-29.

**Purpose:** To determine the influence of superphosphate; superphosphate and limestone; and superphosphate, ground limestone, and stable manure, on the yields of winter legumes grown in rotation.

**Land history:** Not known.

**Soil:** Andalusia and Prattville, Greenville sandy loam; Hackleburg, Ruston sandy loam; Sylacauga, Decatur clay loam. Land nearly level.

**Procedure and conditions:** Plots were one-twentieth of an acre. One replication. The same land was used continuously.

Yields were calculated on the basis of cuttings of the green tops from two or three small areas on the plots. The areas harvested totaled, approximately, 100 square feet. At Andalusia monantha vetch was grown during each of the 3 years; at Hackleburg hairy vetch was grown in 1927 and a mixture of hairy and monantha vetches in 1929; at Prattville monantha vetch was grown; and at Sylacauga hairy vetch was grown.

Ground limestone was applied in 1923 at Hackleburg, Sylacauga, and Prattville, and in 1924 at Andalusia. The rates of application per acre were as follows: 400 pounds of superphosphate, 4,000 pounds of ground limestone (marble dust at Sylacauga), and 6 tons of stable manure. The superphosphate and stable manure were applied just before the planting of the legumes.

**Results:** Given in table 52.

TABLE 52.—*Effects of specified fertilizers on the green weight yield of vetches, near Andalusia, Hackleburg, Prattville, and Sylacauga, Ala., 1927-29*

Fertilizer	Average green weight yield of vetch per acre			
	Andalusia, 3 crops, 1927-29	Hackle- burg, 2 crops, 1927, 1929	Prattville, 1 crop, 1929	Sylacauga, 1 crop, 1927
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
None.....	4,865	2,269	3,630	1,589
Superphosphate.....	13,186	10,802	5,929	8,474
Superphosphate and ground limestone.....	20,542	14,665	11,071	7,718
Superphosphate, ground limestone, and stable manure.....	24,054	18,876	11,071	16,798

Bailey, R. Y., Williamson, J. T., Duggar, J. F. Experiments with Legumes in Alabama. Ala. Agr. Expt. Sta. Bull. 232, 44 pp., illus. 1930. See pp. 21-23.  
 Tidmore, J. W., head, Dept. Agron. and Soils, Ala. Poly. Inst., Auburn, Ala. Through correspondence of July 25, 1936.

## FLORIDA

**Conducted by:** Agronomy Department, Florida Agricultural Experiment Station, Gainesville.

**Conducted at:** Northwest, Florida.

**Period:** 1930-32.

**Purpose:** To determine the phosphate requirements of winter legumes and their resultant effect on succeeding crops, from 21 legume cover crop experiments.

**Land history:** The land had been in corn, sometimes corn and velvet beans, and occasionally cotton, from 8 to 20 years. Velvetbeans were grazed off some years but there is no record of the number of years. The yields without fertilizer on these fields ranged from 15 to 18 bushels per acre of corn, 25 to 30 bushels of peanuts for the shelling plants, and about one-third to one-half bale of cotton.

**Soil:** The soil of the fields was Norfolk, Ruston, and Tifton sandy loams. The fields were level to gently rolling with moderate or no erosion.

**Procedure and conditions:** Plots were one-fifteenth of an acre in size and were in triplicate. The experiment was not necessarily run on the same plots each year.

Cover crops were sown broadcast from October 15 to November 15, the latest recorded date of planting being December 12. Cover crops were sown at the following rates: Monantha vetch, 30 pounds;



hairy vetch; 35 pounds, and Austrian peas, 40 pounds per acre. Cover crops were harvested about April 14.

The seed bed was prepared either by disking or plowing.

Variety of corn used was Whatley.

Superphosphate was applied broadcast, usually in November. The amounts are indicated in the table below.

**Results:** Given in table 53.

TABLE 53.—*Effect of superphosphate on the growth of winter legumes and their resultant effect on corn yields, Northwest, Fla., 1930-32*

Cover crop	Average yield per acre					
	No superphosphate		300 pounds superphosphate per acre		600 pounds superphosphate per acre	
	Cover crop (green weight)	Corn	Cover crop (green weight)	Corn	Cover crop (green weight)	Corn
	Pounds	Bushels	Pounds	Bushels	Pounds	Bushels
None.....		14.1		16.5		15.9
Austrian peas.....	5,365	21.9	9,193	25.3	10,131	25.1
Monantha vetch.....	5,309	20.8	9,389	25.1	9,927	25.2
Hairy vetch.....	4,644	21.6	8,159	24.6	8,722	25.9
Average of cover crops.....	5,106	21.8	8,914	25.0	9,593	25.4

Stokes, W. E., Agron., Fla. Agr. Expt. Sta., Gainesville, Fla. Through correspondence of Aug. 6, 1936. (Unpublished data.)

## GEORGIA

### EXPERIMENT A

**Conducted by:** Georgia Agricultural Experiment Station in cooperation with the Bureau of Chemistry and Soils, United States Department of Agriculture.

**Conducted at:** Experiment, Ga.

**Period:** 1930-32.

**Purpose:** To determine the effect of various ratios of phosphorus, nitrogen, and potash used to fertilize vetch, Austrian peas, and cowpeas.

**Soil:** Cecil sandy clay loam.

**Procedure and conditions:** All plots in the experiment had received the same fertilizer treatment since 1923. Vetch and Austrian winter peas were each grown for 2 years.

**Miscellaneous:** As the fertilizer requirements of vetch and Austrian winter peas appeared to be the same the results have been averaged. On this soil phosphorus was the important element in fertilizing; therefore, the other two elements are omitted in the report of the results as presented here.

**Results:** Given in table 54. (Excluding cowpea yields).

TABLE 54.—*Effects of various amounts of superphosphate on the yields of vetch and Austrian winter pea hay, Experiment, Ga., 1931-32*

Annual application of superphosphate per acre	2-year average yield of vetch and of Austrian winter pea hay per acre <sup>1</sup>
None.....	Pounds 452
87 pounds.....	768
175 pounds.....	1,105
262 pounds.....	1,491
350 pounds.....	1,835
437 pounds.....	1,717

<sup>1</sup> Air-dried.

Ga. Agr. Expt. Sta. Ann. Rept. (1932), 55 pp., illus. See p. 23.  
 Bledsoe, R. P., Agron., Ga. Agr. Expt. Sta. Through correspondence of July 27, 1936.

## EXPERIMENT B

**Conducted by:** Georgia Agricultural Experiment Station.**Conducted at:** Experiment, Ga.**Period:** No date given.**Purpose:** To determine the residual effects on vetch of fertilizer applied to cotton at various rates.**Procedure and conditions:** Vetch was planted on a series of plots which had been fertilized for cotton for the previous 7 years with varying amounts of fertilizers which analyzed 8-3-3. (Phosphoric acid, nitrogen, and potash.)

All plots were harvested April 30.

**Results:** Given in table 55.TABLE 55.—*The residual effect of fertilizer, applied to cotton at various rates, on the yield of vetch, Experiment, Ga.*<sup>1</sup>

Amount of fertilizer applied to cotton	Yield of vetch per acre		Amount of fertilizer applied to cotton	Yield of vetch per acre	
	Green weight	Dry weight		Green weight	Dry weight
None.....	Pounds 2,400	Pounds 608	600 pounds.....	Pounds 15,000	Pounds 2,926
200 pounds.....	14,000	2,198	800 pounds.....	23,600	4,026
400 pounds.....	14,700	2,658			

<sup>1</sup> Date not given.

Bledsoe, R. P. A Preliminary Report on the Value of Hairy Vetch and \* \* \* Ga. Agr. Expt. Sta. Bull. 146, pp. 189-208. 1927. See p. 200.

## YIELDS OF SEED AND HAY OF VARIOUS WINTER SOIL-CONSERVING CROPS IN—

## GEORGIA

## EXPERIMENT A

**Conducted by:** Georgia Coastal Plain Experiment Station in cooperation with United States Department of Agriculture.

**Conducted at:** Tifton.

**Period:** 1930-33.

**Purpose:** To determine whether good seed yields of specified winter legumes can be secured in Georgia.

**Land history:** The land had been previously cropped to cotton, corn, and peanuts.

**Soil:** Tifton sandy loam. There was a gentle slope to the land and very little erosion.

**Procedure and conditions:** Austrian winter peas and vetches were cropped in 1931 and 1933 on different land. Seed was inoculated with commercial inoculating cultures. There were two replications of the plots each of which was one-twentieth of an acre in size.

The land was prepared for seeding by turning and harrowing. Seed was sown in 18-inch rows between October 20 and 25.

There was no fertilizer applied to any of the crops.

**Results:** Given in table 56.

TABLE 56.—Seed yields of specified legumes, Tifton, Ga., 1931 and 1933

Crop	Date of blooming	Yield per acre	
		1931	1933
		<i>Pounds</i>	<i>Pounds</i>
Austrian winter peas <sup>1</sup> .....	Apr. 28	101	63
Austrian winter peas, 16021.....	May 1	100	
Tangier peas.....	May 10	6	186
Monantha vetch <sup>1</sup> .....	Mar. 25	282	130
Purple vetch.....	May 1	0	47
Hungarian vetch.....	Apr. 15	29	24
Common vetch, 34947.....	May 1	15	161
Common vetch.....	do.....	151	124
Oregon hairy vetch.....	May 10	2	21
Smooth vetch.....	do.....	10	41
Horsebean, 15974.....	Mar. 20	121	

<sup>1</sup> General planting.

Stephens, J. L. Winter Legume Cover Crops \* \* \* Ga. Coastal Plain Agr. Expt. Sta. Bull. 23, 44 pp., illus. 1934. See pp. 5, 39, 40.

Stephens, J. L., agent, Bur. Plant Indus., U. S. Dept. Agr., Ga. Coastal Plain Expt. Sta., Tifton, Ga. Through correspondence of July 22, 1936.

## EXPERIMENT B

**Conducted by:** Georgia Agricultural Experiment Station.

**Conducted at:** Experiment, Ga.

**Period:** 1928-33.

**Purpose:** To determine the acre yields of air-dry hay in the tops of Austrian peas, hairy vetch, and monantha vetch for 5 years, crimson clover for 4 years, and a mixture of hairy vetch and Abruzzi rye and a mixture of Austrian peas and red rust-proof oats for 3 years.

**Procedure and conditions:** The rye, oats, and legumes in the mixtures were each sown at the rate of 30 pounds of seed per acre.

**Results:** Given in table 57.

TABLE 57.—*Hay yields of specified winter cover crops, Experiment, Ga., 1928-33*

Crop	Average yield of air-dry hay per acre					Average <sup>1</sup>
	1928-29	1929-30	1930-31	1931-32	1932-33	
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Austrian peas.....	4,113	6,107	2,203	1,593	1,348	3,073
Hairy vetch.....	3,987	7,029	2,918	2,985	2,128	3,809
Monantha vetch.....	4,743	5,588	3,309	4,446	2,464	4,110
Crimson clover.....	4,475	3,577	968	798	-----	2,455
Hairy vetch and Abruzzi rye.....	-----	-----	2,427	3,239	2,322	2,663
Austrian peas and oats.....	-----	-----	1,649	2,321	1,313	1,761

<sup>1</sup> Three 5-year averages; one 4-year average; and two 3-year averages.

Hale, G. A. Winter Legume Experiments with Cultural Recommendations. Table I. Through correspondence of Apr. 13, 1936, with H. P. Stuckey, Dir., Agr. Expt. Sta., Experiment, Ga.





